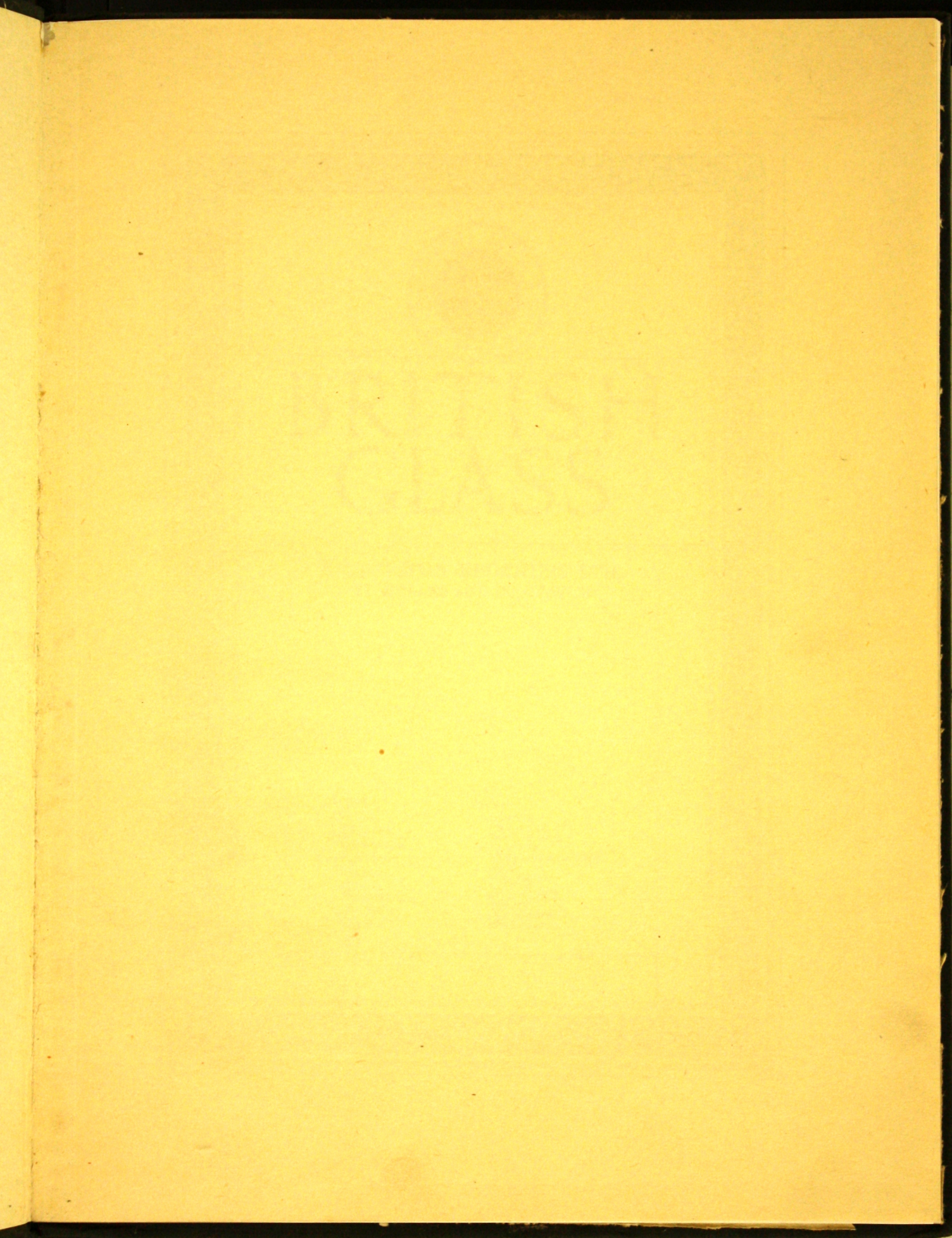
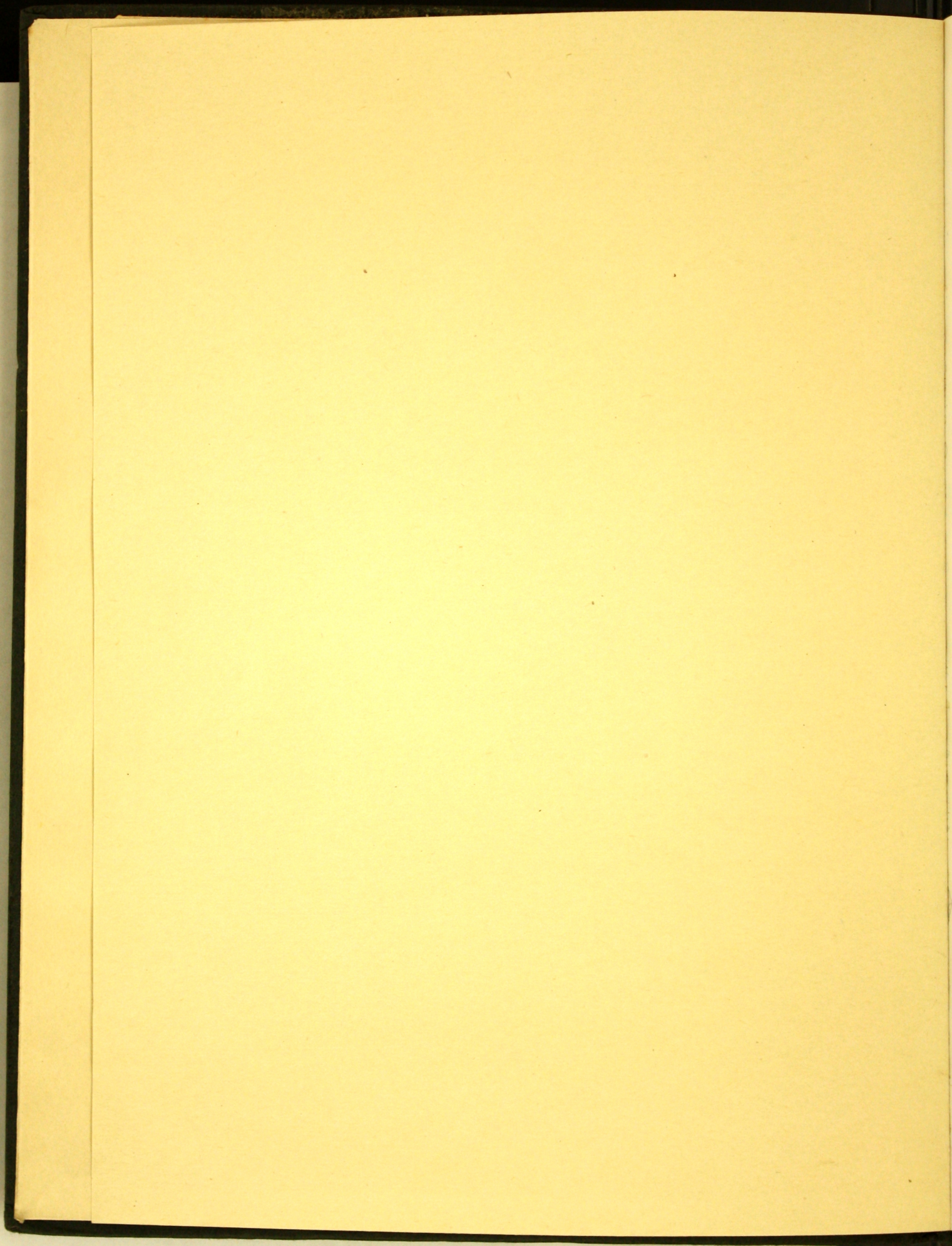




PILKINGTON BROTHERS
LTD.









BRITISH GLASS

PILKINGTON BROTHERS LTD.
ST. HELENS AND DONCASTER

OFFICES:

LONDON
LIVERPOOL
MANCHESTER
MELBOURNE
AUCKLAND
PERTH,
W. AUSTRALIA
CAPE TOWN
BOMBAY

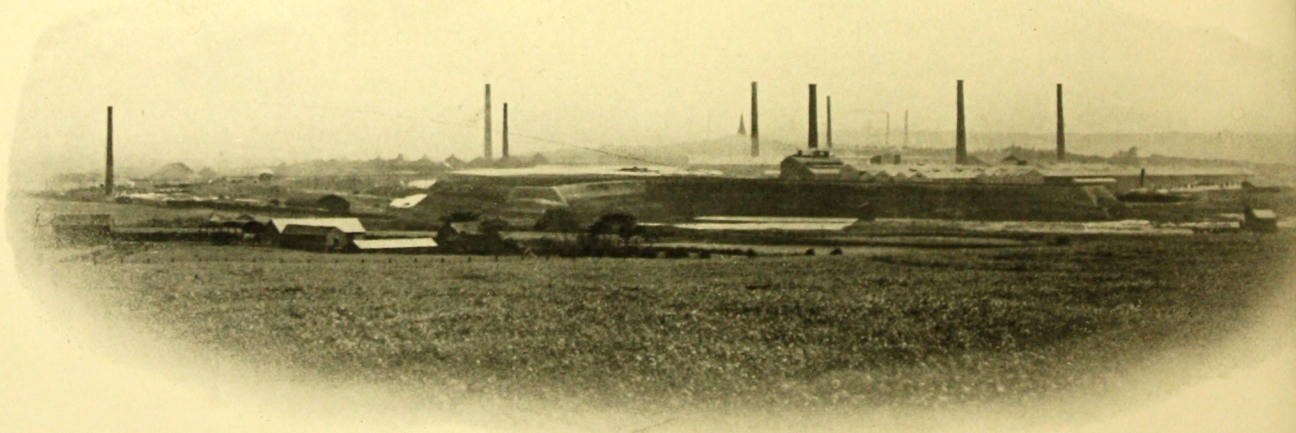
DEPOTS:

LONDON
BRADFORD
BIRMINGHAM
GLASGOW
NEWCASTLE-ON-TYNE
LEEDS
SHEFFIELD
BRISTOL
NOTTINGHAM
NAPLES
BUENOS AIRES
SHANGHAI

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*Cowley Hill Plate Glass
Works, St. Helens.*



AN HOUR'S IMPRESSIONS OF PILKINGTON BROTHERS

By Sir Basil Clarke

A GREAT LANCASHIRE INDUSTRY

(Reprinted from the "Liverpool Express")

PILKINGTON'S! . . . The name had not crossed my consciousness for fifteen years or more, and as my motor car jogged along the homely streets of St. Helens to their works, I sat wondering in what connection that name had been so clearly impressed on my memory. Then I remembered. Yes. They were the firm who, years ago, when glass-making was gloomily listed among the "doomed trades of Great Britain"—industries "killed by foreign competition"—confronted all the prophets by quietly overhauling their equipment and processes, and without calling for help from anyone, succeeded in beating all competitors at their own game.

A fine achievement, and one which, by constant self-examination and improvement, they contrive to perpetuate; but one you would never hear of if it were left to Pilkingtons to proclaim it. For that is their way—that quiet "do it and say 'nowt'" way which is so characteristic of the Lancashire in which they live.

It runs throughout their business method. An American traveller walked into their works not long ago to show them the "newest thing ever invented" for the delicate task of picking up big sheets of plate glass. It was a queer-looking frame of vacuum rubber rings which fixed themselves on to the flat surface of the glass like the

suckers of an octopus and held on by suction while cranes pulled the frame in any direction wanted. They would be forced to buy it, he said, for once seen it could not be done without.

SURPRISING THE YANKEE

They said nothing (Lancashire fashion), gave him a good lunch (again Lancashire fashion), and then took him into the works and showed him an appliance just like his—at work! He gazed open-mouthed. It had been at work there for years. They had quietly invented the machine themselves and put it into practice long before the idea had ever reached the United States.

How indicative and tell-tale these little things are! I should perhaps have asked conventional questions about staff-welfare—hostels, sports and such like—but in the Board Room I noticed a photo of the St. Helens Recreation Rugby Football Team (the Pilkington Glass Works' team), and learnt that they are high up in the first division of the *Rugby League. And as I sat talking with the secretary our voices were pleasantly drowned by the lusty singing of lads in an adjoining process room. Workers who play football so well, lads who sing so gaily while at

* The Team has since won the Lancashire Rugby League Cup 1923.



Sheet Glass Works, St. Helens.

AN HOUR'S IMPRESSIONS

work, are all the testimonial one needs to the efficiency of works' welfare and happy conditions of service.

SELLING TO DETROIT

The works themselves abound in such disinterested testimonials to quiet efficiency. I watched for myself the care with which plate glass was made, the honesty with which any tiny flaw was "spotted" and marked by the examiners. But this, as proof of conscience, care and value for money, was dwarfed by another sight which no one pointed out to me. It was the sight of a consignment of plate glass windscreens for motor cars addressed for shipment to:

FORD MOTOR COY.,
DETROIT, U.S.A.

The British firm that can quietly sell plate glass to Henry Ford, in Detroit, against all the crash and clamour of competition from American plate glass, made virtually on the spot, must have excellencies of the very highest order.

One more little picture. A girl was painting the back of a plate glass mirror with red paint. The plate glass had been silvered in the ordinary way to make it a mirror and then a coat of copper laid over the silver back to protect it from heat and damp. This is a special Pilkington process to make their mirrors last longer.

"But why paint again over the copper?" I asked. "A copper back is surely better seen and appreciated if not painted over."

"Yes," I was told, "by a British customer perhaps, but not by Chinese customers for whom these mirrors are intended. They find a copper

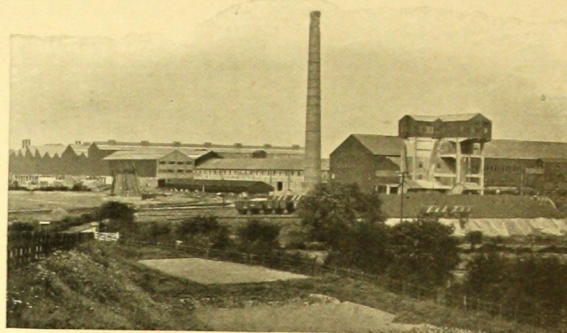
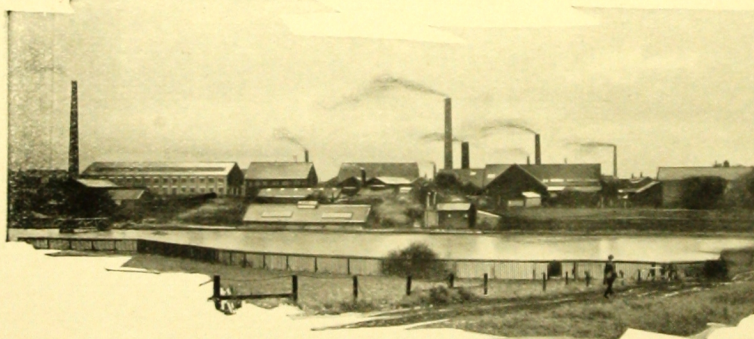


Plate Glass Works, Doncaster.

back unusual and are suspicious. 'Why him no led (red)?' they ask. We therefore paint again over the copper with red to restore the normal appearance of a mirror. In other words, we hide its virtue rather than try and persuade the customer he is wrong."

A fine study in the "adapting of products to markets"—and strangely characteristic of a business method which is well-practised in the hiding of virtues—even its own.

For in this great concern which "goes its own gait" with so little noise and outward show, I found everywhere most invigorating evidences of British Industrial enterprise, care and integrity—and a kindly "humanness" pervading it all. There is not much wrong with British industry run on these lines. Self-reliance, self-help, chiefs who can "think" and workers who can sing—here is the spirit that will preserve British markets against any competition.



*Cathedral Glass Works,
St. Helens.*

*Canadian Works, Thorold,
Ontario.*



POLISHED PLATE GLASS

PREFACE

THERE IS NO SUBSTITUTE FOR GLASS.

In designing buildings there are many alternative materials open to our choice, but there is nothing to take the place of GLASS. For our Windows it is necessary to have transparency and a substance unaffected by the weather or by the smoky atmosphere of towns. GOOD GLASS answers these requirements.

In order to overcome inherent difficulties in some of the new mechanical processes for the manufacture

of Window Glass, drastic changes of composition have had to be resorted to which have proved detrimental to the weather-resisting properties. In the various methods which we employ there has been no need to do this. Pilkington Glass, therefore, is not only a recognised standard of quality, but of DURABILITY.

In this Catalogue a complete range of the varieties of glass we manufacture is illustrated with suggestions of the purposes for which each is best adapted.

IF you could analyse your impressions on entering the Reception Hall of a magnificent hotel for the first time—if you could pick out the details in the picture that contribute most to the splendour, richness and beauty of the scene—you would think first of "Polished Plate Glass."

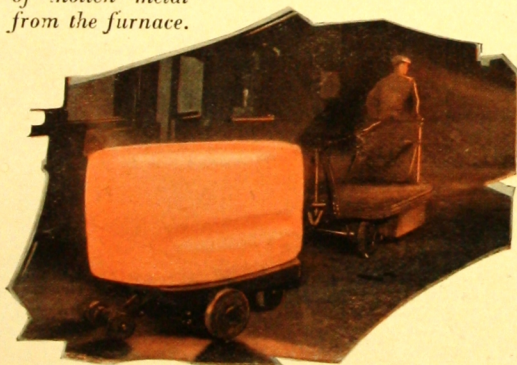
Great mirrors—with their entrancing illusions of size and distance, cut crystal doors with their gleaming facets flashing a thousand times as they swing to and fro; tall, noble-looking windows of classic design—these are the finishing touches that complete the architectural conception. Polished Plate Glass makes all the difference! How is it made—what elaborate processes does it go through that give to it the peerless sparkle of any jewel? It is an interesting story.

How Plate Glass is made

Plate Glass making used to be a secret art known only to a few. The early glass-makers might have been anxious to let daylight into English homes but they didn't let any into the secret of how they made their glass.

Heavy barriers and heavier penalties kept intruders outside the precincts of glass works in those days. Glass-making was a protected industry in every sense of the word, and we read that a special Act provided a penalty of seven years transportation for every person breaking into the manufactories with intent to damage glass or tools.

*Towing a crucible
of molten metal
from the furnace.*



Perhaps that accounts for the origin of "seven years bad luck if you break a mirror!"

However, these restrictions must have served their purpose, for even to-day it is possible to say something about Plate Glass that is new to many who are directly concerned with it in building and architecture; and as all the processes that it goes through are interesting (some of them, indeed, spectacular), perhaps it is worth while to mention them in detail.

Bib 189 149

POLISHED PLATE GLASS

The Ingredients

of Polished Plate Glass are approximately the same as those in other kinds of glass—silica (white sand), soda (soda ash or saltcake), and limestone. But they are chosen with more care to ensure exceptional purity.

Now, in a nutshell, the outstanding difference in manufacture between Polished Plate and ordinary Sheet Glass is that the former is “cast” and rolled into plates, while the latter is blown into large cylinders, then split, reheated and flattened.

The Fire-clay Crucibles or Pots

The crucibles for melting the ingredients of Polished Plate Glass constitute one of the heaviest expenses of the industry. They are made of special fire-clay and need to be seasoned for nine months or a year before they are strong enough to stand the 3000° Fahrenheit of the furnace. Their average life is about three weeks. Each crucible holds a ton of molten glass, or “metal” as it is called. A large department at St. Helens is occupied in preparing the clay and making these crucibles.

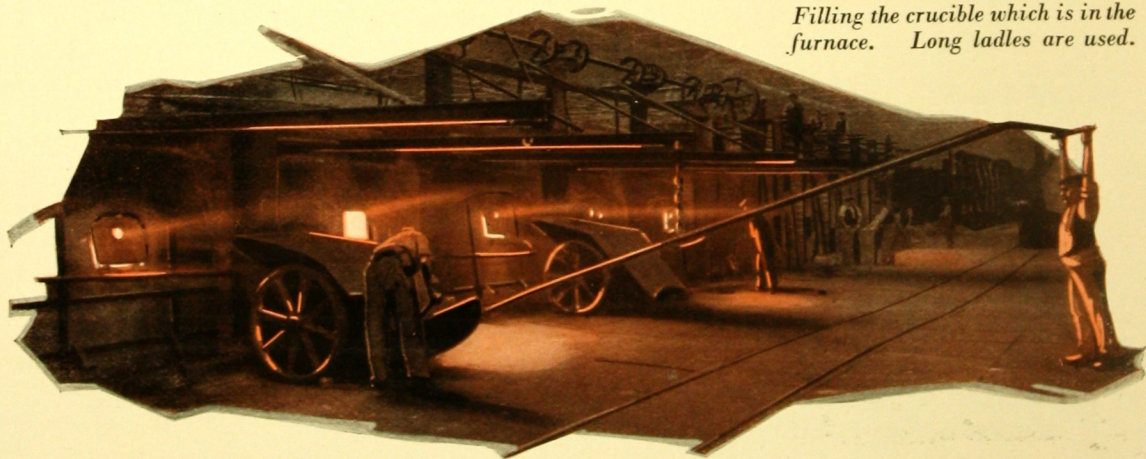
When the ingredients of Polished Plate Glass come from the mills mixed in their proper proportions they resemble a grey powder. The pots are filled from trucks and for seventeen hours they stand in the gas-heated furnaces.

In the Furnaces

As the mixture melts, it sinks down in the pot and loses bulk. Three fillings are necessary before the pot contains a sufficient charge.

At first the metal takes on a heavy, sticky consistency full of bubbles, but later on, careful observation shows it to be clear and liquid. Then the gas pressure is eased off for four hours, the glass is skimmed of impurities and is soon ready for the casting table.

Filling the crucible which is in the furnace. Long ladles are used.



CASTING THE GLASS



This picture shows the molten glass being poured on the casting table. The overhead crane empties the crucible along the table in front of the roller.

Casting the Glass

The casting table is hollow, water-cooled and made of iron, and at one end lies a great roller covering its whole width.

The molten glass is poured out upon the table and the roller slowly moves (just once) across it, flattening it into a broad plate.

Adjustable gauges at the sides of the table regulate the thickness of the plate.

The glass soon loses its white-hot glow and becomes greenish-white in colour, translucent but not transparent. Its surface is rough, coarse, and unpromising, but inside it is crystal clear. Any sudden exposure to cold air would crack it, so most elaborate precautions have to be taken to ensure gradual cooling.

ANNEALING AND COOLING THE GLASS

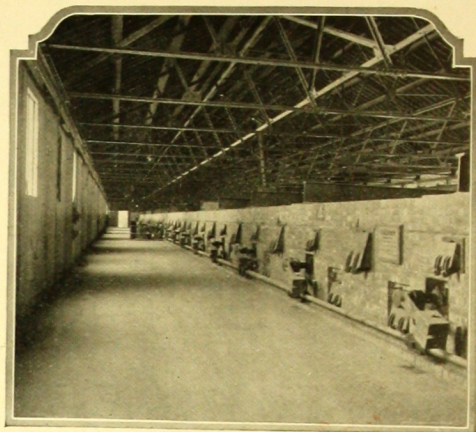
In the old days glass used to be cooled by passing it into a kiln and the cooling took four days. Nowadays it can be done in the same number of hours.

Straight from the casting table the glass is passed into a "lehr," which is a series of warm annealing chambers of graduated temperatures. It is propelled along by bars which lift it forward periodically.

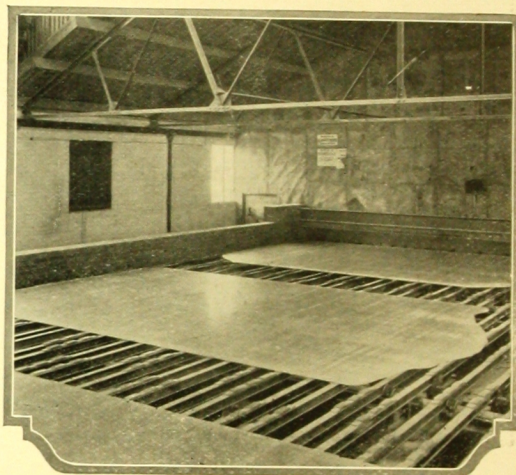
Then, thoroughly cool, it emerges under a felt flap on to a large receiving table where it is examined carefully for any flaws, bubbles or surface defects. Here is where the quality of the ingredients and the skill of the glass-maker are on trial. Wherever a plate is found to contain a defect, however slight, it is cut into sizes which will eliminate it.

This is only the first of a series of inspections. In its progress through the factory, every inch of the plate must survive the scrutiny of each department.

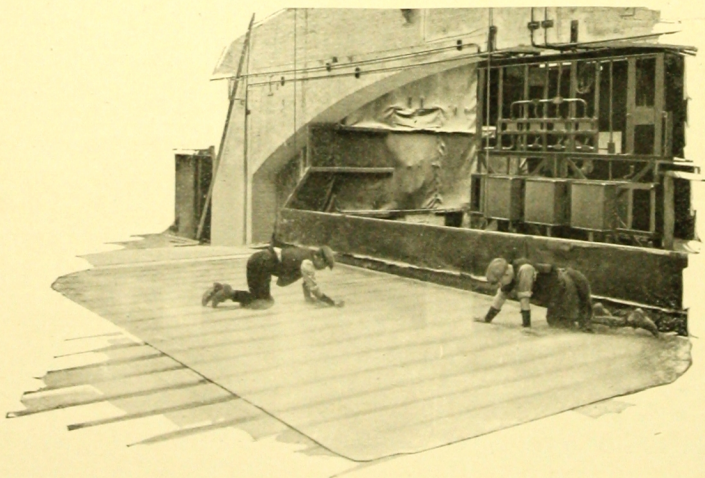
A specially trained staff is employed to examine the plates and maintain what is known in the trade as "Pilkington Quality."



A "lehr," or series of cooling chambers.



The plates of glass leaving the "lehr." Note the travelling bars which lift it along.



A first examination. The men carefully go over each inch of the glass and mark with a piece of chalk any flaw or imperfection which might have crept into the glass.

SQUARING THE ROUGH PLATE

The cutters then square the plate and a large iron frame fitted with rubber suckers is lowered by an overhead crane on to the glass. A vacuum pump provides the suction and the plate can safely be moved in any direction with facility.

The illustration below shows one of these frames lifting a plate from the storage rack to the grinding table where a man is waiting to guide it where required.

Laying the Glass

Following the glass in its overhead progress, we see it suspended over a circular iron table.

These tables weigh several tons ; they rest upon trolleys and are moved upon rails to any part of the building.

Each table is prepared by being flooded with Plaster of Paris and water. The surface of the table is covered section by section with a thick paste upon which the plates of glass are lowered.

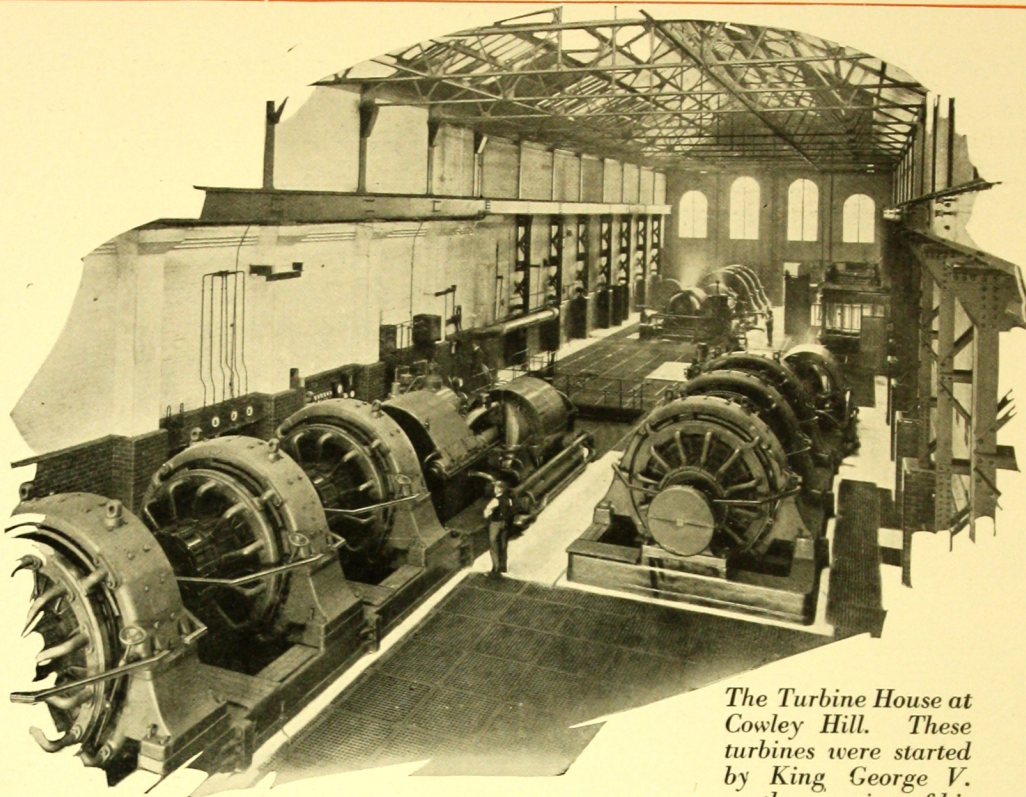
Workmen then stand upon the plate and tramp it into the plaster with a kind of rhythmic dance. It takes only a few minutes before the plate is firmly embedded in the Plaster of Paris.

The workmen know this process as "swimming the plate," and when the surface of the table is entirely covered with glass it is ready to go to be ground and polished.

"Swimming the Plate." This shows a plate of glass being laid on to the grinding table. Plaster of Paris is washed on first, then the men tramp the glass down firmly. The whole table is covered with plates of glass. Note the plate in the background suspended by suction.



THE GRINDING SHED



The Turbine House at Cowley Hill. These turbines were started by King George V. on the occasion of his visit in 1913.

GRINDING AND POLISHING

Then the table is moved by motor down a central aisle or track under one of the vast grinding machines standing at the side of the shed. These "grinders" consist of two circular discs, iron shod, which descend and press on to the surface of the glass. The whole table is set rotating by a powerful motor, which causes the grinders, in turn, to go round.

Water, sand, emery and other abrasives are poured on the glass and before very long a perfectly level surface is obtained.

All the abrasives poured on the glass and the material washed away, are lost; no less than 150,000 tons of waste are removed from the grinding sheds every year to be carried $1\frac{1}{2}$ miles by pipe-line and dumped in another part of the grounds.



One of the Plate Glass Laboratories at St. Helens.

POLISHING THE GLASS

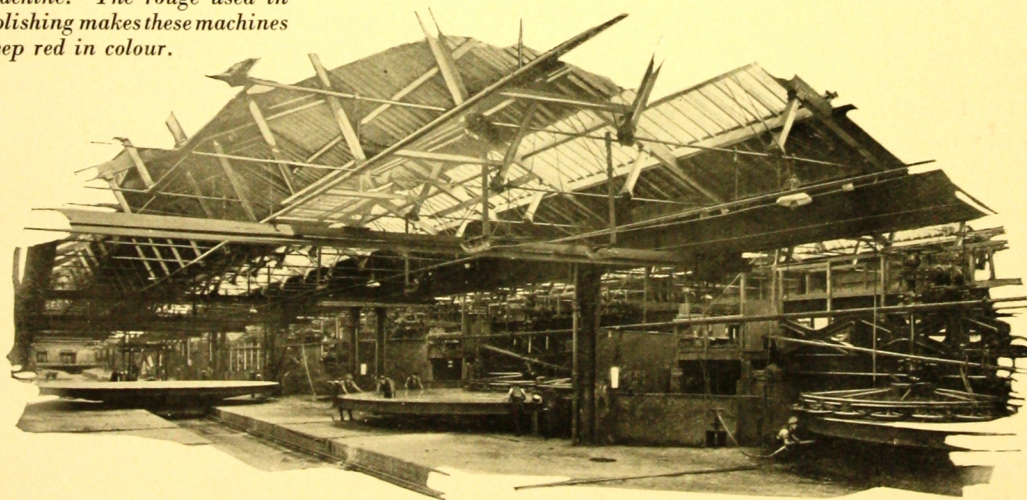
Then the table is towed across the shed to the polishing machines, which are similar in appearance to the grinders, except that felt pads take the place of the two large iron discs or runners. Rouge and water are fed on to the Glass which gives it the beautiful permanent finish that always identifies Polished Plate Glass.

The glass is stripped from the table and turned over, this time resting upon soft lambskin cloths which hold it firmly to the table. The grinding and polishing are repeated on *this* side of the glass until it is reduced to its final thickness.

STRIPPING and REVERSING
the glass so that the other side may
be treated. It rests on wet lamb-
skin cloths in this process.



*The Polishing Shed, showing
run-way. Three large tables
can be seen, the nearest one
actually in the polishing
machine. The rouge used in
polishing makes these machines
deep red in colour.*



POLISHING THE GLASS

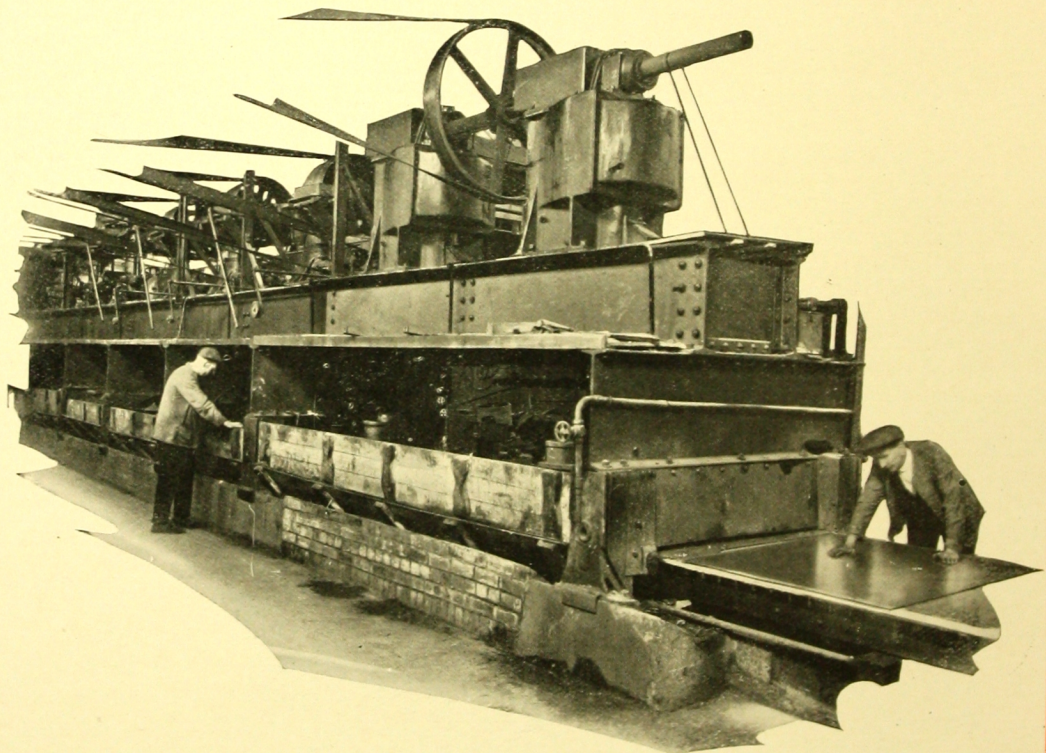
The plates of glass are now taken to the warehouse where expert inspectors again very carefully scrutinise them for defects, and if they pass this last stringent examination they are placed "in stock" on the racks.

The Grinding and Polishing of Plate Glass has gone through several important changes during the last fifty years—changes which have reduced the time and risks involved in the operations, and have also improved the quality of the finished product.

The latest improvement, illustrated below, shows Plate Glass being ground and polished in one continuous process. The glass is passed on a continuously moving bed under a succession of separate Grinding, Smoothing and Polishing Machines as shown, and comes out with a finely polished surface.

A CONTINUOUS GRINDER & POLISHER.

This machine receives and grinds the glass and then turns it out polished at the other end.

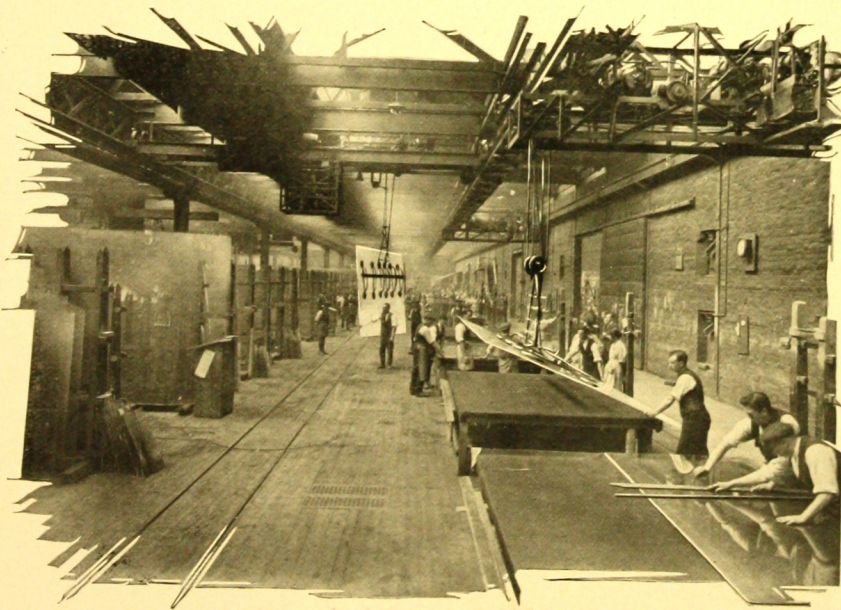


A FINAL INSPECTION

This final inspection is a lengthy one and involves the use of special lighting. Once through the examiner's hands, the hallmark of approval has been set upon the glass—none the less significant though it be but a cryptic chalk mark in the corner. The foregoing description shows the elaborate care and constant attention necessary from start to finish in the manufacture of Polished Plate Glass. The finished result is a product of flawless beauty—heavier, thicker and many times stronger than ordinary glass—yet practically invisible.



Examining Plate Glass in a corner of the Warehouse. An attendant carefully notes the result. The large plate suspended on the left is $1\frac{1}{4}$ " thick, and weighs one ton, for ships' portlights.



A general view of the Plate Glass Warehouse, showing the method of moving glass from place to place. An overhead crane with a "suction" frame renders transport safe and easy.

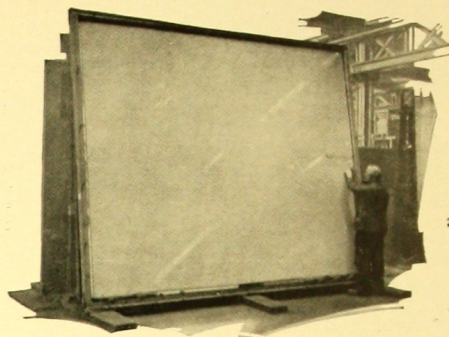
THE FINISHED ARTICLE

The truest tribute ever paid to Plate Glass was by a famous architect, who said, "Looking through good Plate Glass is like looking through an open window."

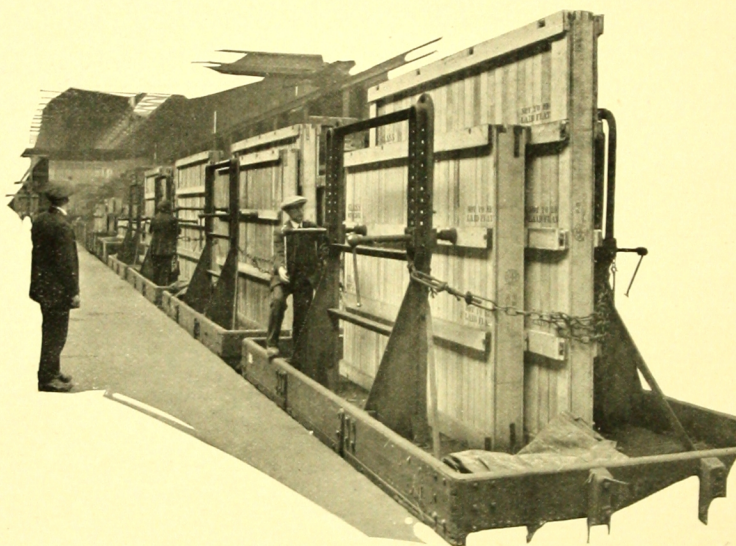
Plate Glass is Flawless

Polished Plate Glass contains neither waves nor swirls to confuse the eye and distort the vision. It is the *only* glass to use where an impression of quality must be conveyed, as apart from mere lighting.

Plate Glass gives perfect light transmission and true reflection. Its application in windows, doors, porches, verandahs, leaded lights, etc., virtually transforms the appearance of the whole building.



PACKING AND DESPATCHING. Packing the Plate in its case for despatch.



Placing the cases in the special trucks.

The 4 o'clock Plate Glass train leaving Cowley Hill for the main line.



VARIOUS USES OF PLATE GLASS

Plate Glass is generally supplied about $\frac{1}{4}$ " thick unless any other thickness is specified. The following table shows usual thicknesses and the purposes for which they are used :—

Thickness	Purpose Used
$\frac{1}{8}$ " to $\frac{3}{16}$ "	For railway carriage doors, general glazing in lead lights and small squares
$\frac{1}{4}$ "	For windows of city offices, public buildings, shop fronts, show-cases, railway carriage windows and frameless lights, motor car screens, tramcars, table tops, mantelpiece and window sill covers, door plates, shelves, etc.
$\frac{3}{8}$ "	For large shop fronts, shelves, table tops in cafes, hospitals, etc.
$\frac{1}{2}$ "	Ships' saloon windows, operating tables, long shelves, gauge-glass protectors.
$\frac{1}{2}$ " to $1\frac{1}{2}$ "	Floor, deck and portlights of ships, aquarium tanks, etc.

The Sizes of Polished Plate

(Manufacturing, not Warehouse sizes)

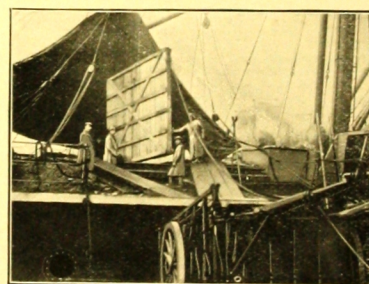
In the ordinary course of manufacture the following sizes are produced. Larger sizes can be supplied to order up to 288" by 168" in $\frac{3}{8}$ " thickness. Before specifying such large sizes, enquiry should be made some time ahead, as delivery is governed by the size-limits of railway tunnels and bridges. All our branches are equipped with a fleet of lorries for prompt delivery by road where necessary.

Thickness	Size	Weight Per Super Foot Approx.
$\frac{1}{8}$ "	90× 40	2 lbs.
$\frac{3}{16}$ "	110× 72	2 $\frac{3}{4}$ "
$\frac{1}{4}$ "	165× 110	3 $\frac{1}{2}$ "
$\frac{5}{16}$ "	180× 130	4 $\frac{1}{4}$ "
$\frac{3}{8}$ "	280× 130	5 $\frac{1}{4}$ "
$\frac{1}{2}$ "	180× 120	7 "
$\frac{5}{8}$ "	132× 114	8 $\frac{3}{4}$ "
$\frac{3}{4}$ "	124× 108	10 $\frac{1}{2}$ "
$\frac{7}{8}$ "	120× 100	12 $\frac{1}{4}$ "
1"	110× 96	14 "
1 $\frac{1}{4}$ "	108× 72	17 $\frac{1}{2}$ "

Arriving at the docks.

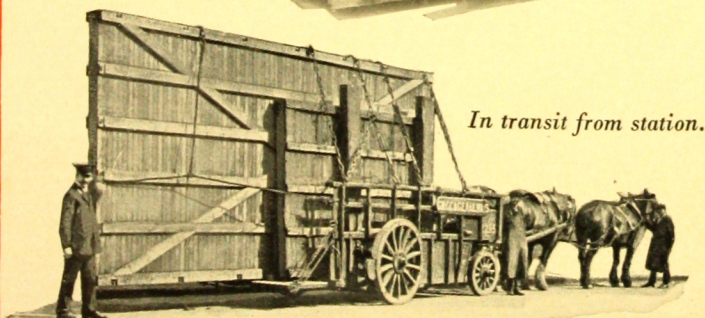


PLATE GLASS FOR SHIPMENT



On Board.

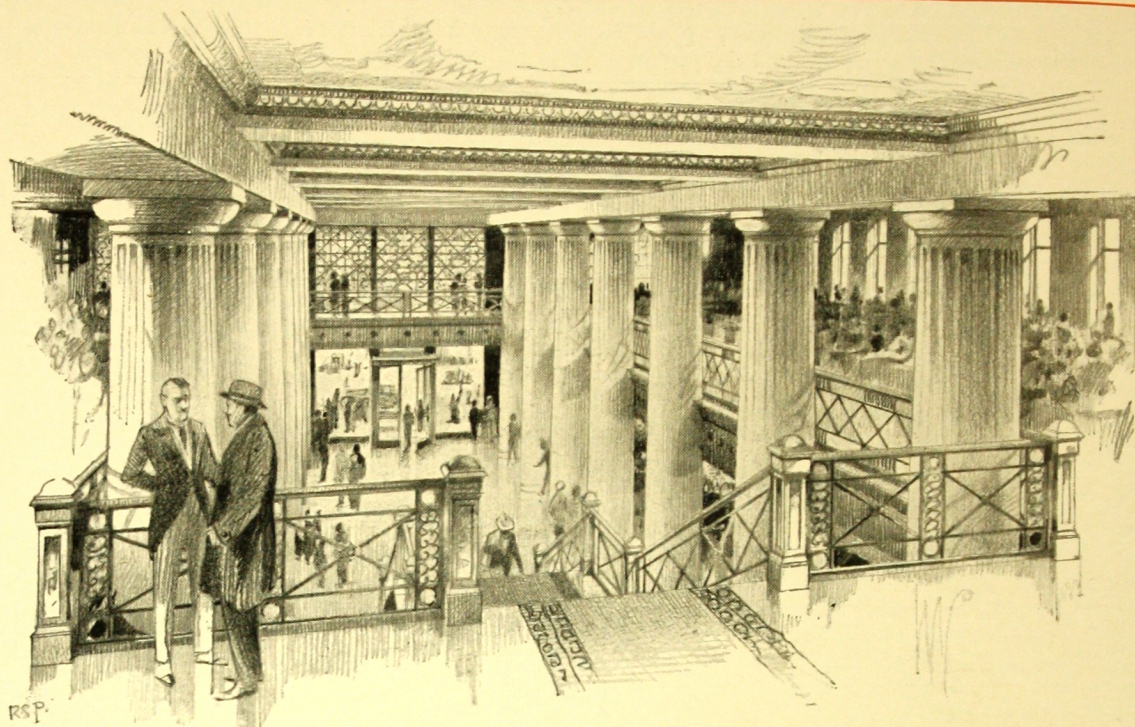
By road, showing carrying frame for "naked" glass.



In transit from station.



A BUSINESS PALACE

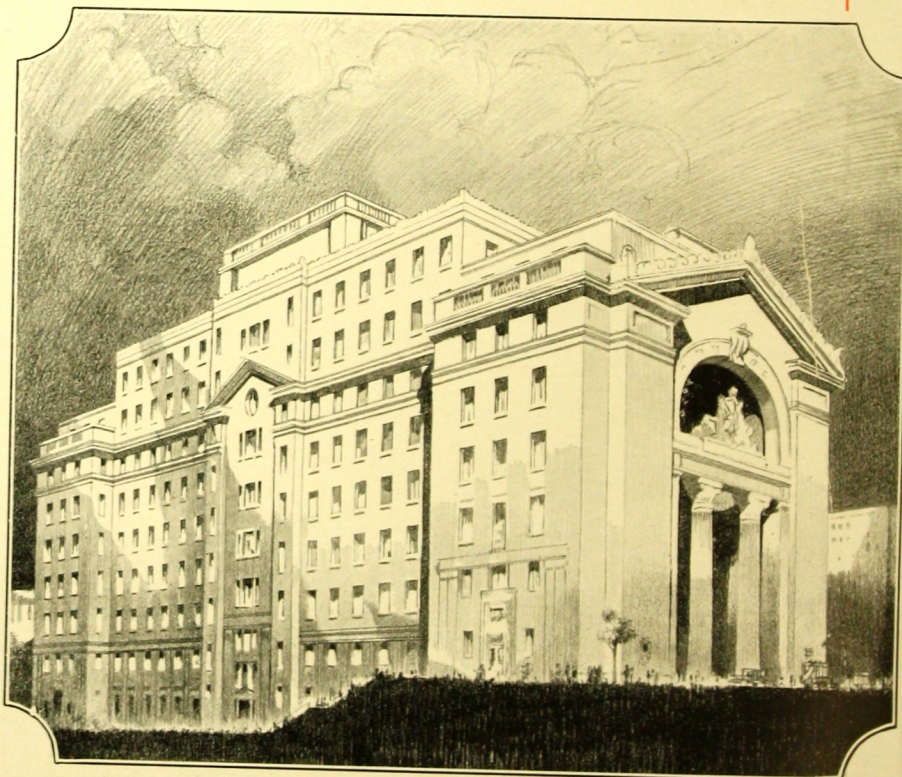


BUSH HOUSE LONDON

*The magnificent
Business House
in Kingsway.*

*Pilkington's
Polished Plate
Glass used
throughout.*

*Glazing by Henry
Hope and Son.*



Pilkington Glass—Pilkington Glazing



Architects : Ross & Macdonald

The Mount Royal Hotel, Montreal

All the glass in this building was supplied and glazed by Pilkington Brothers, Canada. The hotel contains more than 11,000 feet of Polished Plate Glass, 12,000 feet of Mirrors, 27,000 feet selected 26-oz. Sheet Glass, and 900 feet of Polished Wired Glass.

The Canadian Works are located at Thorold, Ontario.

OTHER DATA ON PLATE GLASS

Polished Plate Glass is sold in four qualities :-

“GLAZING FOR GLAZING ”—Standard for general glazing purposes.

“ BEST GLAZING ”—A higher grade for better-class work.

“ O.G. FOR SILVERING ”—A selected grade for mirrors generally.

“ SILVERING QUALITY ”—The highest grade for first quality mirrors, museum cases and other purposes where a superfine glass is required.

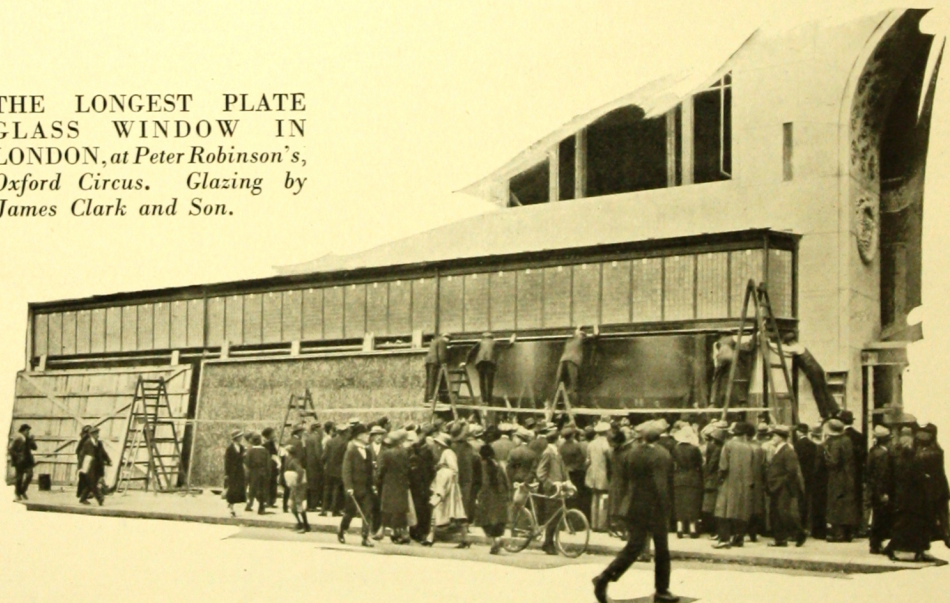


Unless otherwise specified, Polished Plate Glass is supplied approximately $\frac{1}{4}$ " thick with a variation of $\frac{1}{32}$ " either over or under, which is the normal standard thickness manufactured. Glass $\frac{1}{4}$ " thick, with a variation of $\frac{1}{64}$ ", under or over, can be supplied, but at a higher price.

The lesser thicknesses being obtained by prolonged grinding are naturally more costly than $\frac{1}{4}$ ", while greater thicknesses (over $\frac{1}{4}$ "), which are specially cast, are proportionately higher in price.

Thick “ROUGH CAST ” is made for pavement floor and cellar lights from $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ " to $1\frac{3}{4}$ " thick.

THE LONGEST PLATE
GLASS WINDOW IN
LONDON, at Peter Robinson's,
Oxford Circus. Glazing by
James Clark and Son.

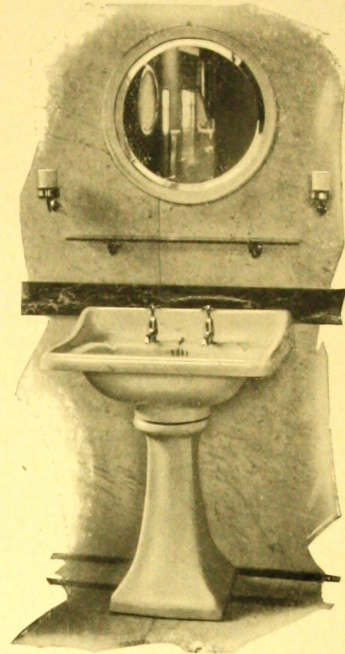


MIRROR GLASS



SIZES

Mirror Glass can be had in any size up to 200" long x 120" wide.

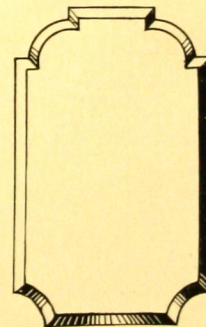
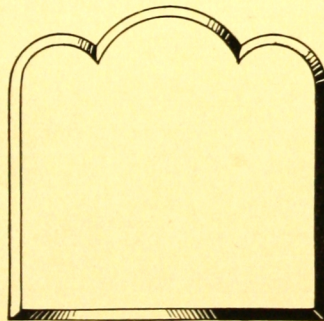
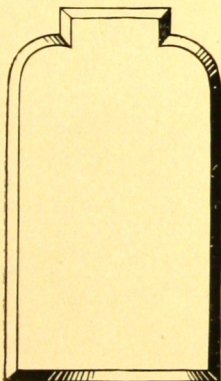


During the final inspection of Polished Plate Glass in the warehouse, a certain portion of the plates is set aside for mirror-making.

This glass is the very finest that comes off the casting table, and it *needs* to be, for the slightest defect is accentuated when backed by the silvering.

After the glass has been silvered, a backing of copper is electrically deposited which gives protection against heat steam or damp and prevents wrinkling and scaling. This metallic-backing process has been perfected in our works of recent years and Pilkington Mirrors can always be thoroughly relied upon to stand the test of time and exposure.

A Few Patterns of Shaped Bevelled Mirrors



Send for diagrams of full range of stock shapes and sizes.

BEVELLED GLASS

Bevelling undoubtedly adds a very effective finish to Polished Plate Glass, and shows it to the best advantage. It is a highly skilled process similar in principle to grinding but is generally done by hand. The edge of the glass is roughed smoothed and polished on horizontal wheels of varying surfaces, and an expert eye is required when working curved and pattern plates with mitres, etc. The finished article is well worth the extra cost, however, and for fanlights, furniture and cabinet mirrors, etc., nothing gives a finer appearance than the gleaming facets of good bevelling.

WIDTHS OF BEVELLING.

The usual widths of bevel are from $\frac{1}{4}$ " to 2", but we can supply up to 3" if required. The $\frac{1}{4}$ " and $\frac{3}{8}$ " sizes are principally used for lamps and advertisement tablets. Hand bevelled plates can be supplied up to 70" by 24" or 50" by 30", and special bevelled plates up to 160" long by 100" wide.

Bevelled Silvered Plate Mirrors for the Furniture Trade

This is a large and important branch of our business and the most popular sizes are :

SQUARE PLATES.

Length	Width	Length	Width	Length	Width
14" × 10"		20" × 14"		24" × 18"	
16" × 12"		20" × 16"		30" × 20"	
18" × 24"		22" × 16"		36" × 24"	

Wardrobe Sizes from 10" to 18" wide by 48" to 60" long.

OVAL PLATES.

Wide	Deep	Wide	Deep	Wide	Deep
14" × 10"		18" × 14"		24" × 18"	
16" × 12"		20" × 16"		30" × 20"	

FRAMELESS MIRRORS.

With bevelled and polished edges, principally ovals, up to 24" wide by 18" deep.

SHAPE BEVELLING.

A special leaflet on Shape Bevelling will be sent on request.



Showing Plate Glass protecting the top of a valuable antique dressing table.

DECORATIVE GLASS

There are many methods of rendering Plate Glass semi-obscure and at the same time giving it a pleasing decorative character.

A highly skilled staff of designers is retained to prepare special designs or work to architects' drawings. We have a large selection of stock designs but for the guidance of the architect who prefers to make his own designs, we are always pleased to submit specimens of the various treatments and processes.

The following processes, when judiciously used, add a touch of distinction to what would otherwise be plain, rather flat glazing.

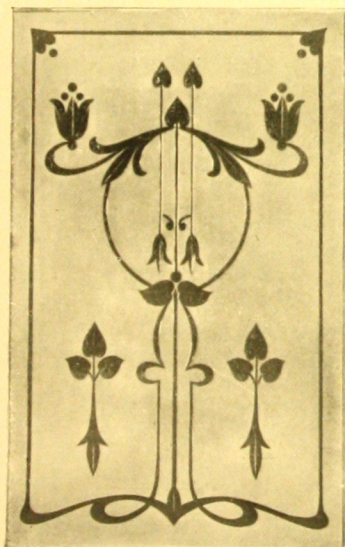
BEVELLING—Much used for Mirrors, to enrich door panels and cabinet makers' work.

BRILLIANT CUTTING—An effective method of incising a design in the glass, to give a remarkably rich and brilliant appearance.

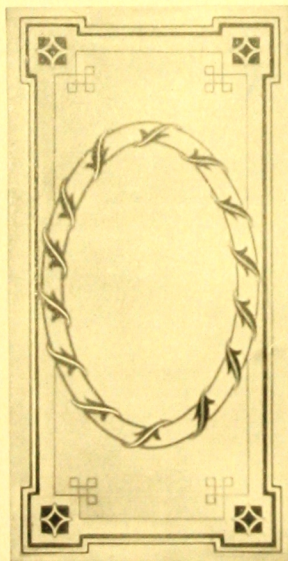
ACID EMBOSSING—A method of delineating the design on either a clear or opaque ground, giving a soft effect which may be intensified as desired by additional acid treatment.

OBSCURING—A white effect rendering the glass semi-opaque.

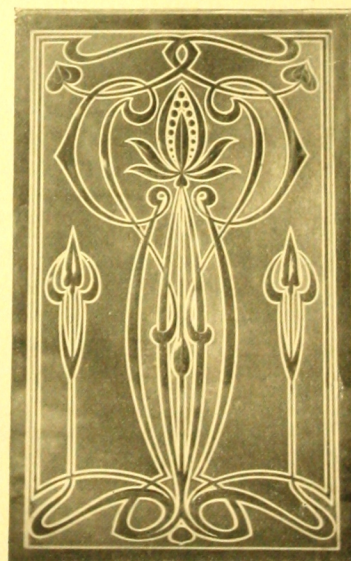
SAND BLASTING—A method of rendering the glass semi-opaque giving a coarse grain to the obscuring. Ornamental designs can also be worked by this process.



BRILLIANT CUT



DOUBLE ACID
EMBOSSSED



FRENCH EMBOSSED

DECORATIVE PLATE GLASS

STIPPLING—making the glass semi-opaque by the use of acid. Specially recommended for interior screens where a bright appearance is wanted; also suitable for working in two or three acid designs.

ENAMELLING—the reproduction of a clear design on an obscured ground.

CRYSTALLINING—produces an effect like hoar frost. A very popular effect used as a background or filling.

COLOURED EFFECTS—can be introduced by staining and painting, while crystallining, stippling and brilliant cutting may be combined to give relief, brilliance and sparkle to “acid embossed” designs.



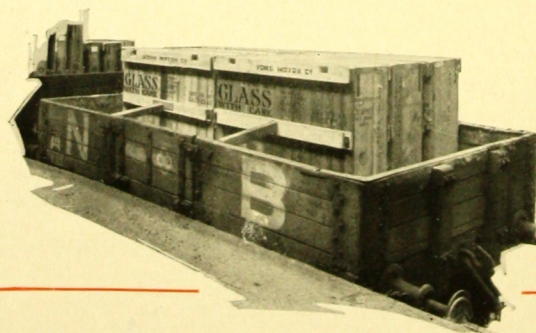
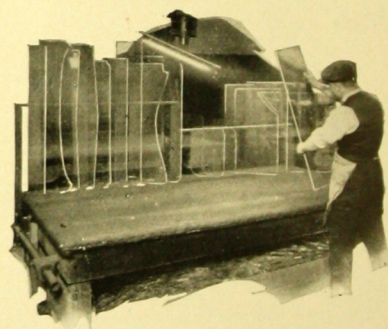
FRENCH EMBOSSED

PLATE GLASS WINDSCREENS

The almost universal adoption of Polished Plate Glass for motor windscreens has led to a high degree of skill in working the edges of the glass, i.e. in flat polishing, rounding and notching.

Similarly, the increased use of Polished Plate for shop fittings, counter and table tops, showcases, shelving, etc., has made it possible to obtain many novel and pleasing shapes in small sizes. A great facility has been attained in working these small sizes and quite intricate shapes are often made to order.

Examining Windscreens. The Plate Glass for windscreens must necessarily be of the very highest quality. Above the bench is a special lighting device which shows up the slightest flaw.



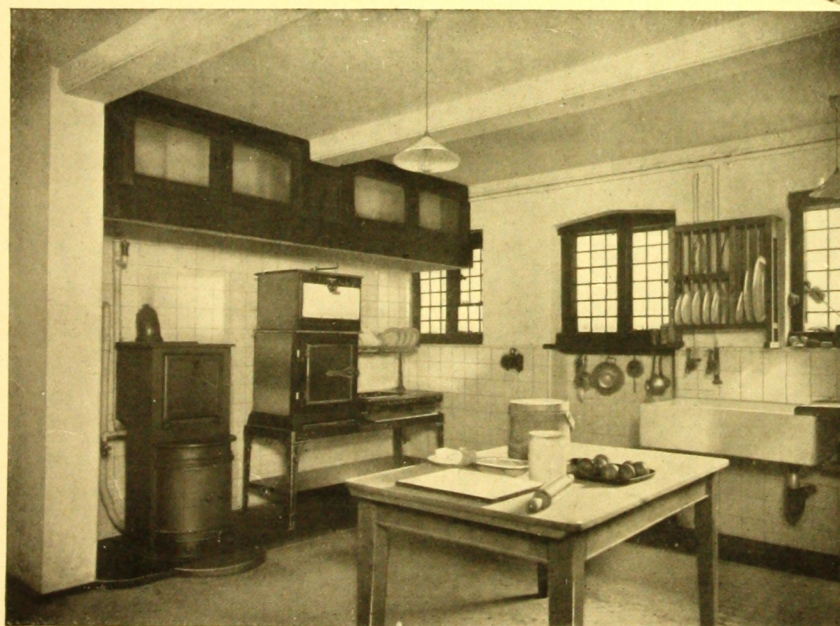
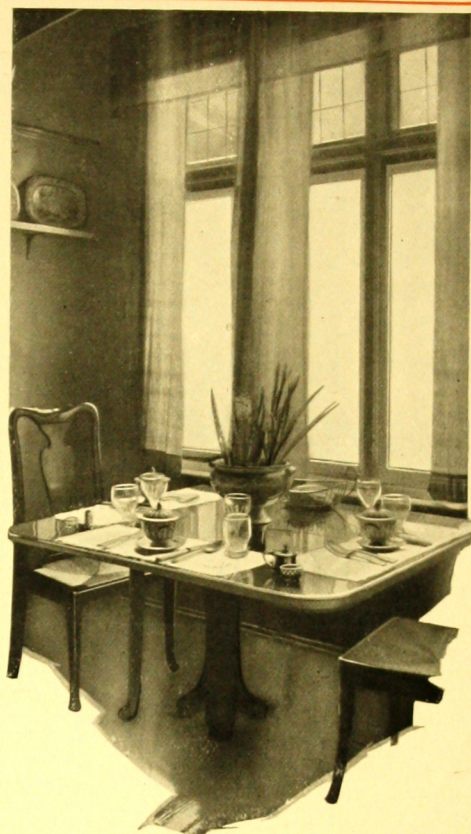
*Windscreens for America.
Part of a consignment of windscreens
for the Ford Motor Company, Detroit.*

PLATE GLASS IN THE HOME

Not only in windows does Polished Plate Glass improve the appearance of any home. It can also be used with great success on articles of furniture such as Washstands, Table Tops and Mantelpieces. In the *bath-room*, Plate Glass is particularly useful. It can be used as shelves (with polished edges) for holding the usual articles of toilet. Plate Glass Mirrors, with and without frames, are described in another section of this book.

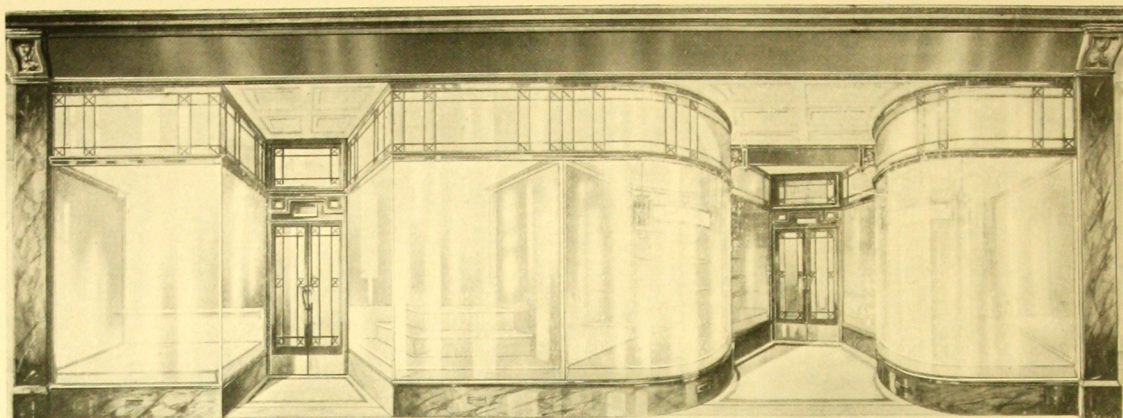
In the *kitchen*, Plate Glass can be used for a variety of purposes, not yet widely enough known. A piece of Polished Plate let into the table makes an excellent pastry board. White opaque tiles round the sink will protect the walls and always remain smart and fresh-looking.

The judicious use of Plate Glass gives distinction to the *drawing room*, and it serves at the same time as an admirable protector. It adds life and sparkle to a room without hiding the fine woodwork it protects. On the contrary it displays and preserves it.



Above, a glass covered table in the dining room. Below, a modern kitchen with glass splashboard, tiles, pastry board and rolling pin. The shelves are bevelled Plate Glass.

PLATE GLASS FOR SHOPFITTING



The left half of these premises shows the cramped restrained effect of using "straight" plate in close proximity to the doorway. The right half of the premises shows the extra window space and the broad, sweeping expanse which Bent Plate gives.

Bent Polished Plate Glass

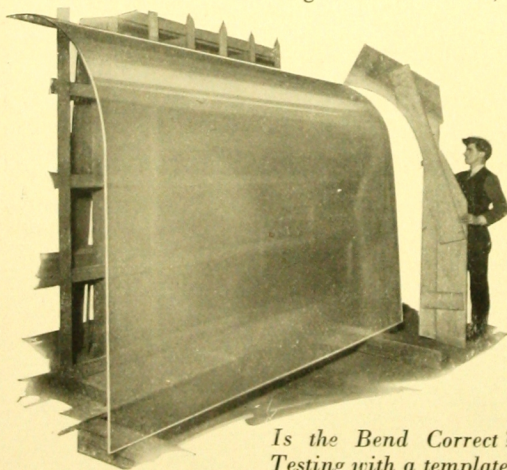
Plate Glass is, of course, universally used for shop windows, and the introduction of a suitable *Bent* Polished Plate has completely altered the trend of shop-front design during the past few years.

Keen competition among department stores—highly specialised selling—has placed a definite value upon every available inch of window space, and Bent Glass has come to the front because it saves this space.

Bent Glass has made a curved window frontage possible; it gives a few extra feet to the area of every window and offers an uninterrupted view of the goods displayed.

It Dispenses with Heavy Brick Supports

Awkward obstructive angles are abolished, and the graceful inward sweeps of Bent Plate Glass afford a more spacious and convenient entrance to the shop itself. Bent Glass can also be used effectively on screens, partitions and domes.



*Is the Bend Correct?
Testing with a template.*

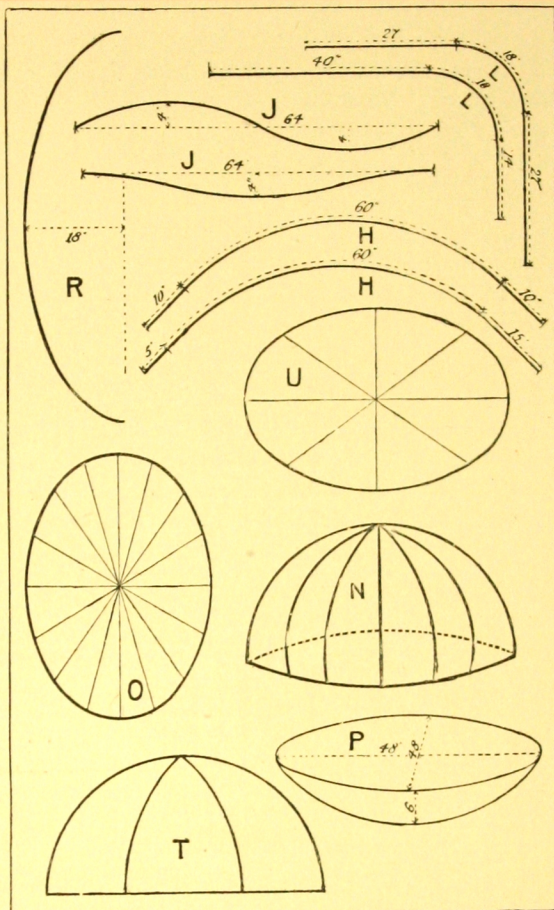
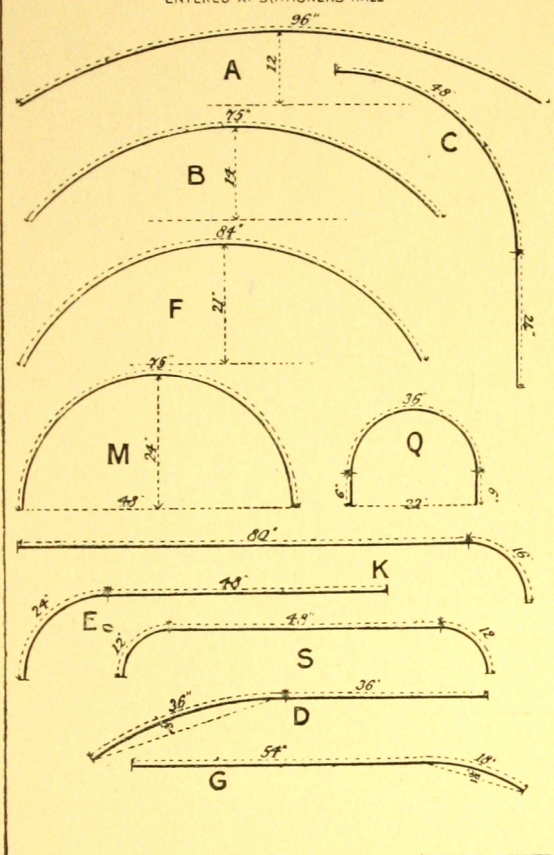
Cathedral Glass can be bent, as also can Figured and Ribbed Rolled, when it is required to complete a scheme or motif involving Bent Glass.

PILKINGTON'S SPHERICAL DOMES are made in one piece Rough Cast about $\frac{3}{8}$ " thick, also in Polished Plate Glass. They are well annealed to withstand changes of temperature and extreme climate. They can be "obscured" if desired, at slightly increased cost. Special instructions for fixing are supplied with the Dome.

The bending of glass is not a simple operation. Special moulds are made in each instance and the process of bending is always attended by a risk of breakage. Prices vary according to the difficulty of the bend and, of course, the size of the plate.

BENT PLATE GLASS

T. & W. IDE'S DIAGRAMS OF CURVES.
ENTERED AT STATIONERS HALL



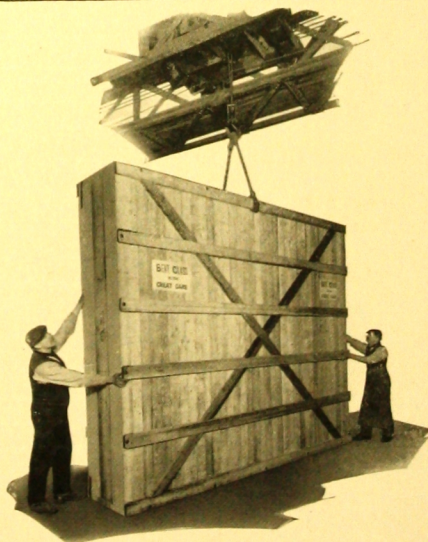
SIZE—In the ordinary course of manufacture, Bent Plate can be obtained up to 160" long. Larger sizes and special bends supplied to order.

When Ordering

or for estimating purposes, a full-size template or drawing on stout paper is required, showing the exact width round the bend. The ends should be clearly marked and if the curve is shown by a single line only, a note on the template should say whether it represents the round or hollow side of the bent glass.

A special pamphlet on Bent Glass, giving full details how to order, will be sent on request.

The diagrams reproduced above are taken from a special leaflet on Bent Plate Glass. This leaflet will be forwarded on request.

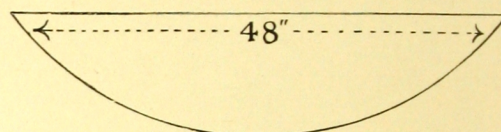
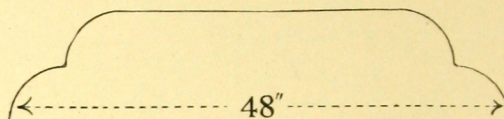
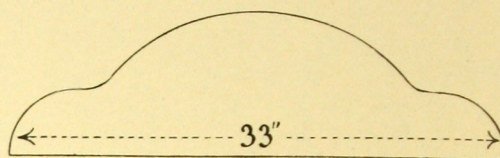


SHELF SHAPING

This is an ever-growing branch of our business. The use of shaped plate for shelving is continually on the increase, and will always be popular while smaller sizes can be sold at such a low price.

Shelf shaping or "working the edges" of plate glass is a highly skilled operation, brought to perfection during the past few years by the introduction of improved machinery.

Here are shown a few of the more ordinary shapes held in stock. A full list and diagrams can be had upon application.



POLISHED WIRED GLASS

Polished Wired Glass is used for motor windscreens and for glazing where protection and complete transparency are required. It gives a highly finished appearance to windows, screens and lifts in hotels, offices and banks, and it can be used for protecting valuable stained glass. Further particulars are given in the "Wired" Section on page 28.



Examining a large sheet of Wired Glass to be used for protecting a stained glass window.

POLISHED WIRED GLASS

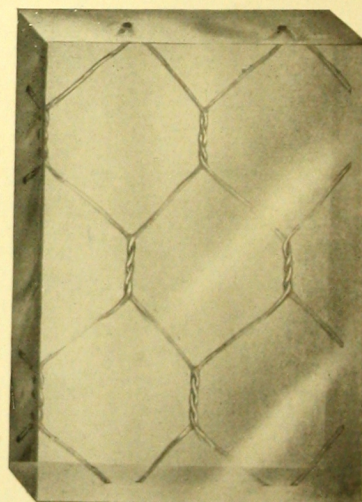
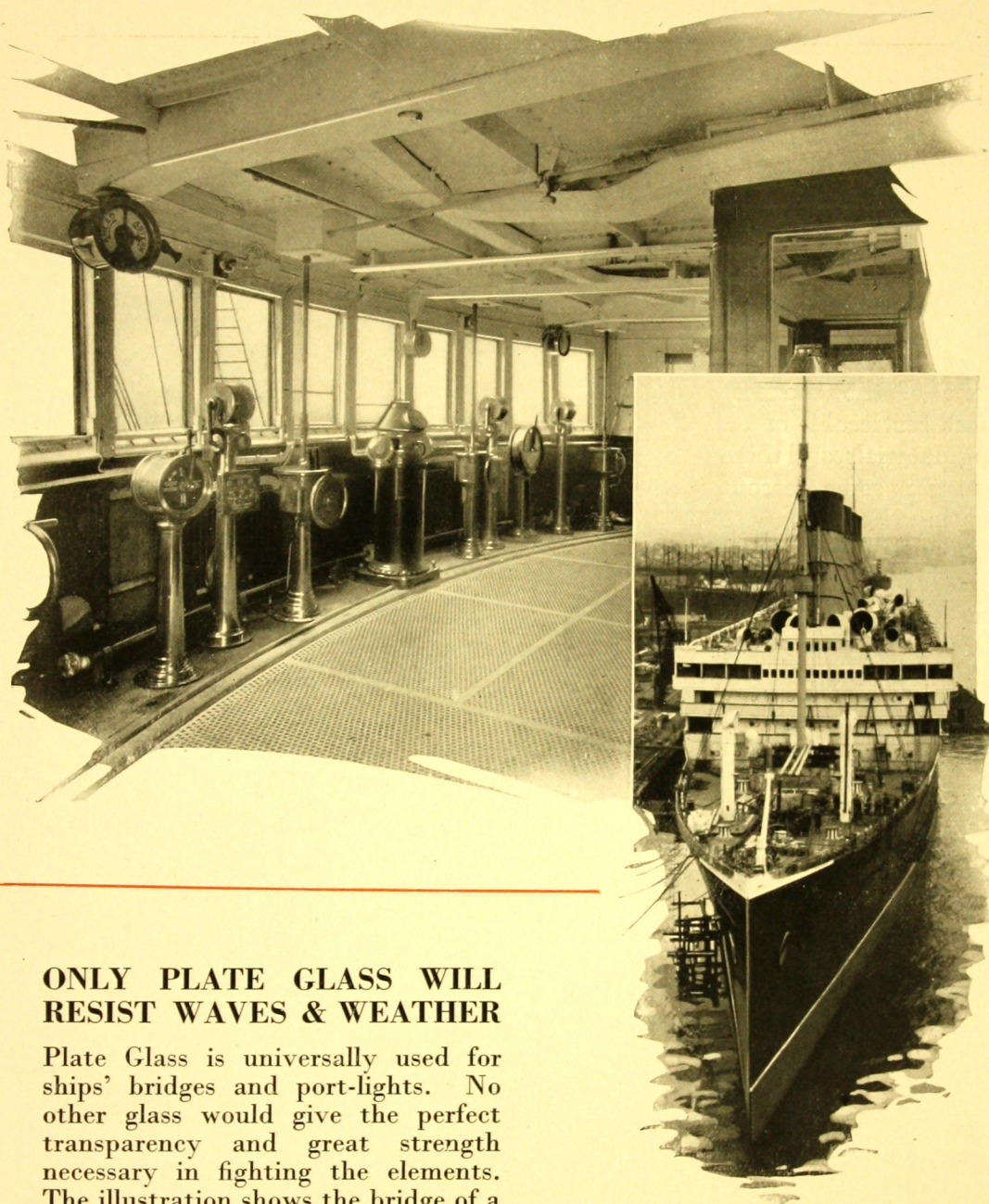


PLATE GLASS FOR SHIPS



ONLY PLATE GLASS WILL RESIST WAVES & WEATHER

Plate Glass is universally used for ships' bridges and port-lights. No other glass would give the perfect transparency and great strength necessary in fighting the elements. The illustration shows the bridge of a giant Cunarder fitted throughout with Pilkington's Polished Plate Glass.

S.S. Aquitania

WIRED GLASS

For Safety and Protection against Spread of Fire; Burglary, etc.

WIRED GLASS is first and foremost a SAFETY GLASS because it ensures :

Protection against *Accidents*,
Protection against *Spread of Fire*,
Protection against *Burglary*,
WITHOUT LOSS OF LIGHT.

SAFETY FIRST !

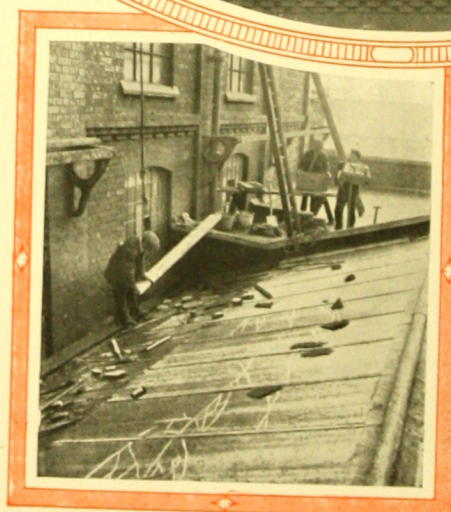
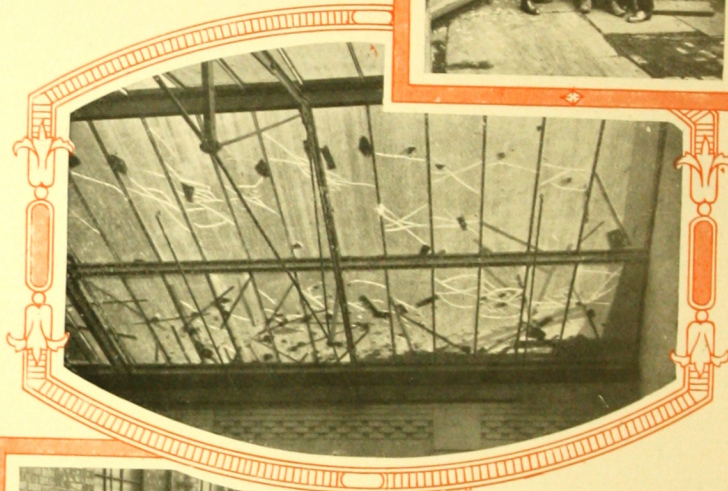
A FREQUENT CAUSE of Accident.

Cut by fall of ordinary glass from broken skylight.

It is one of the cheapest and most serviceable of all Building Materials, and these pages suggest some reasons for adopting *Wired Glass* as the MODERN GLAZING SYSTEM for the numerous purposes described.

View of Wired Glass Roof from below.

Bricks and Rubbish fallen during repairs.



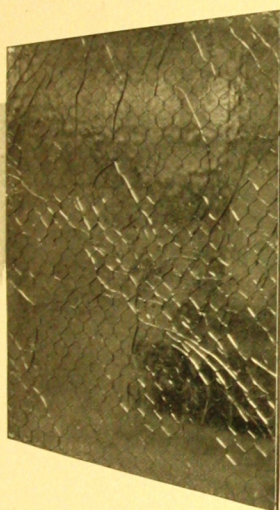
Same roof from above.

WIRED GLASS IS FIRE RESISTING

Wired Glass should be used wherever "Safety First" is a prime consideration. It offers protection against accidents, for while plain glass can be smashed to flying fragments with one blow, WIRED GLASS simply cracks and bends. The wire holds it together. Wired Glass does not fall when broken, so is particularly suitable for roofs. Before wired glass was invented, wire screens were used for protective purposes. These were cumbersome and inconvenient, as they had to be removed when the glass required cleaning.

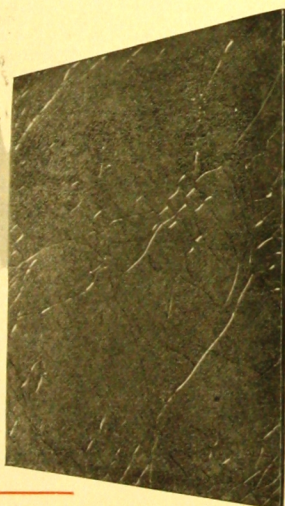
The Wire is embedded in the middle of the Glass

THROUGH FIRE AND WATER



Wired glass after being placed in a fire.

Wired glass after being placed in a fire, and having a hose played upon it.



Wired Glass acts as a fire resister; where ordinary glass would crack and fall from its frame, wired glass hangs together and localises the outbreak. FIRE INSURANCE companies quote lower rates for buildings which are provided with Pilkington's Wired Glass.



THE BRITISH FIRE PREVENTION COMMITTEE.

(FOUNDED 1897 INCORPORATED 1899)

This is to Certify

that Pilkington's Wired Glass (in 2 ft. 2 ft. and 4 ft. 10 1/2 in. panels)

submitted for OFFICIAL FIRE TEST by Messrs Pilkington Bros. Ltd. of St. Helens has been accorded the following classification under the Universal Standards, namely, as affording "Partial Protection" (Class A).

This classification is only accorded to glazing after the Committee's official test of 30 minutes duration at temperatures reaching at least about 1500° Fahr, followed by the application of water from a steam fire engine for 2 minutes.

The average maximum temperature was about 1480° Fahr and the maximum temperature reached at any one point was 1500°.

The full record of the test is published in Red Book.

No 197. Two 2 ft. by 2 ft. panels were in brick. Two 2 ft. by 2 ft. panels were in metal frames. Two 4 ft. by 10 1/2 in. panels were in brick with metal divisions.

The Common Seal of the Committee was affixed hereto in the presence of



Date of Certificate

October 26th 1914

For Secretary

For Secretary

Ellis Mansland

WIRED GLASS RESISTS ENTRY

The use of metal casements, window sashes and general fire-proof construction has led to a very wide demand for Wired Glass.

The certificate of the British Fire Prevention Committee testifies to the FIRE RESISTING properties of Pilkington's Wired Glass, and the two untouched photographs on page 29 show its resistance both to fire and water.

Wired Glass in skylights gives additional protection against burglary, as the wire in the centre of the glass offers a resistance that is very difficult to overcome. It delays the intruder *outside* the building where he can least afford to remain.

Motor windscreens can be rendered harmless in case of mishap, if they are fitted with Wired Glass. The breaking of windscreens is a common motoring accident, and broken glass has turned many a simple mishap into a fatal accident.

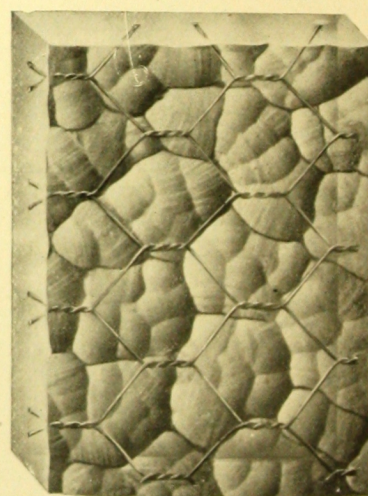
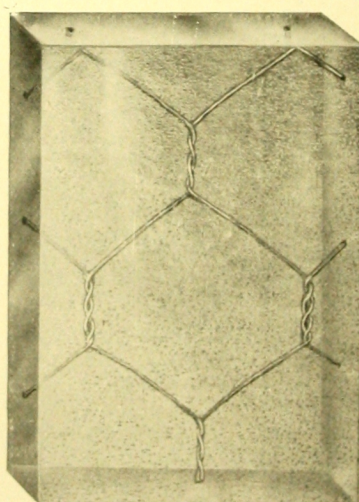
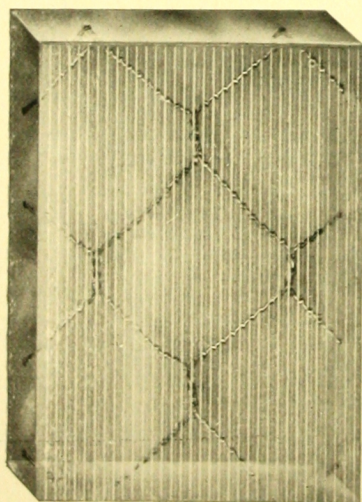
Standard Glass for Safety Glazing

WIRED ROLLED has fine ribs on one surface, about nineteen to the inch.

Thickness, $\frac{1}{4}$ "—Sizes up to 160" long by 40" wide.

WIRED CAST has a rough cast surface and is very widely used in roofing. It is made in the same sizes as Wired Rolled.

WIRED ARCTIC GLASS is a semi-opaque glass of brilliant finish, much used for partitions, screens, doors, ceiling lights, elevator shafts, lavatories, etc. Its pleasing irregular pattern renders the wire almost invisible. Sizes up to 110" long by 40" wide, Thickness $\frac{1}{4}$ ".



WIRED GLASS AND ROLLED PLATE

Standard Glass for Safety Glazing

POLISHED WIRED: A beautiful and durable Glass with a brilliant Surface Polish. Sizes up to 120" long \times 44" wide.

Send for special "Safety First" Booklet which describes and illustrates WIRED GLASS in detail.

Rolled Plate

ROUGH CAST, and **PLAIN** or **RIBBED ROLLED**, are the same as **WIRED CAST** and **WIRED ROLLED**, except that they are not reinforced with wire netting, therefore *NOT FIREPROOF* or *SPLINTER-PROOF*.

Rolled Plate is a cheaper glazing material used where the extra protection of Wired Glass is not required, and is supplied in thicknesses additional to $\frac{1}{4}$ ", viz.:

* $\frac{1}{8}$ " $\frac{3}{16}$ " $\frac{5}{16}$ " $\frac{3}{8}$ "

*Rough Cast is not supplied in $\frac{1}{8}$ ".

The Various Purposes of Rolled Plate

SMALL FLUTED ROLLED PLATE, $\frac{3}{16}$ " and $\frac{1}{4}$ ". An inexpensive glass of good appearance largely used for sky-lights and roofing in public buildings, factories and workshops. It has eleven flutes to the inch, which diffuse strong light and render it soft and pleasing.

$\frac{1}{4}$ " **NO. 2 FLUTED ROLLED (EXTRA WHITE)** is made in extra white metal and is very much in demand for lighting picture galleries and museums. It supplies a bright, soft light and prevents the sun's rays from shining directly on to the exhibits.

PLAIN OR RIBBED ROLLED is very suitable for Horticultural buildings as well as for roofs. The fine ribs on one surface break up the direct glare from the sun, and the glass throws an evenly distributed light.

DOUBLE ROLLED WHITE CAST: $\frac{3}{16}$ " and $\frac{1}{4}$ ". A glass of distinctly superior appearance for similar purposes, which transmits the maximum amount of light.



Waterloo Station glazed with Rough Cast Glass by W. E. Rendle & Co.

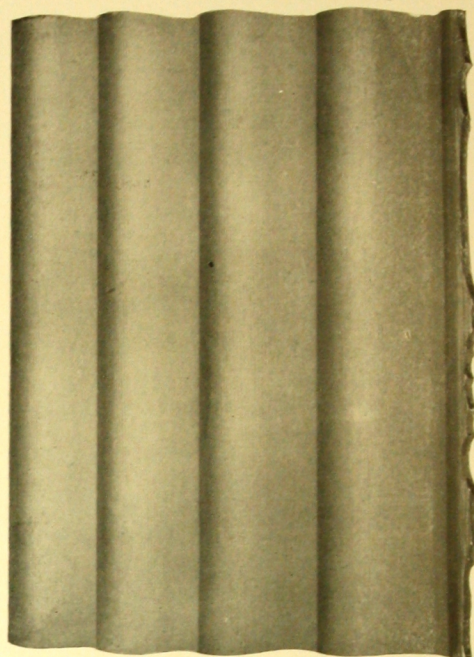
PATENT CORRUGATED GLASS

Patent Corrugated Glass

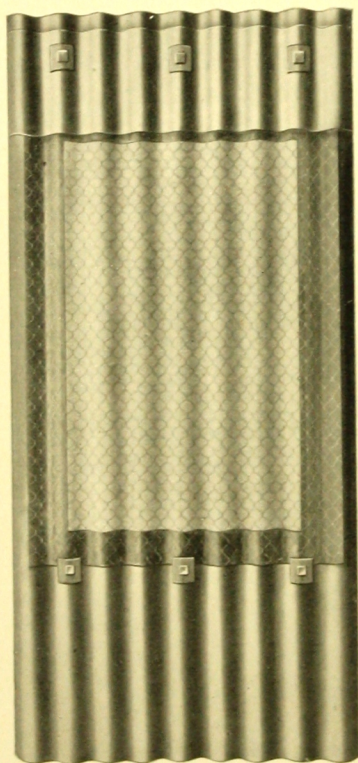
This is an attractive and useful Rolled Plate Glass made to "line up" with Standard Corrugated Iron Sheeting, principally for skylights, etc. It is a big improvement on ordinary flat glazing and adds a touch of constructional finish to ordinary corrugated iron roofing.

Thickness.	Length.	Width.
$\frac{3}{16}$ "	48", 60" and 72"	27"

The corrugations are 3" pitch.
Smaller sizes made for large quantities.



Corrugated Glass for skylights.



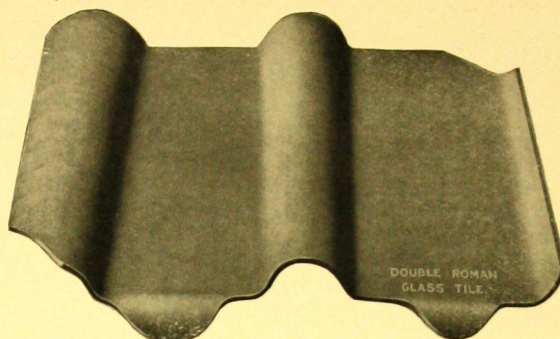
Wired Corrugated Glass

Wired Corrugated is corrugated rolled glass reinforced with wire netting. It is made for safety glazing, without frames, with corrugated iron or corrugated asbestos sheets. It looks exceedingly well when glazed in long spans. Supplied in lengths 48", 60" and 72" by 27" wide, $\frac{1}{4}$ " thick.

GLASS ROOFING TILES AND SLATES

These are for intermixing with Pantiles and Ordinary Roofing Slates, and are made in Plain and small Fluted Rolled patterns, and in sheet glass. The slates are supplied bored with two holes and with wooden pegs for fixing, in Plain Rolled Rough Cast and Sheet Glass.

There are seven shapes to choose from — ordinary flat glass slates, corrugated, single and double Roman, etc. The double Roman is a design of particular interest to architects as it is in thorough keeping with classic style and gives an appearance of well-thought-out constructional finish wherever it is used. USUAL SIZES 15" long by 11" deep.



DOUBLE ROMAN GLASS TILE

A special suggestion book of glass tiles and slates, containing illustrations and full-size diagrams, will be sent on request.

Fluted Glass for Laundry Use

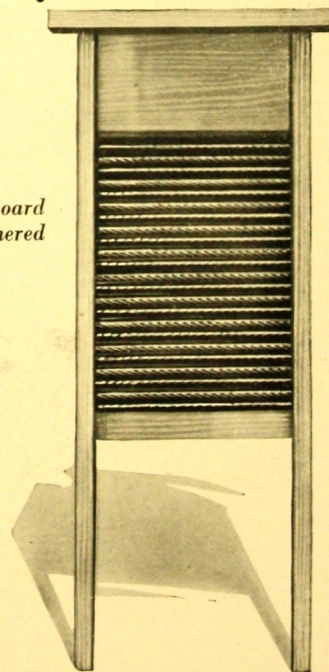
There is a widely increased use of glass in place of the old-fashioned zinc let into washing or "rubbing" boards. Zinc has the disadvantage of corrosion and presents an unsightly appearance after some use. Fluted glass, on the other hand, is unaffected by heat, steam or water. It presents an ideal surface to work upon, and can easily be replaced.

No. 4 FLUTED WASH-BOARD GLASS is usually supplied in size 11" high by 12" wide.

FEATHERED WASH-BOARD GLASS.

A glass for the same purpose but with a ribbed and feathered pattern. Size usually supplied 11 $\frac{7}{8}$ " high by 11 $\frac{1}{2}$ " wide.

Washing Board showing feathered glass.



Daylight-Saving Prismatic Glass

Lighter Rooms Lighter Bills

Daylight Costs Nothing —Use more of it!

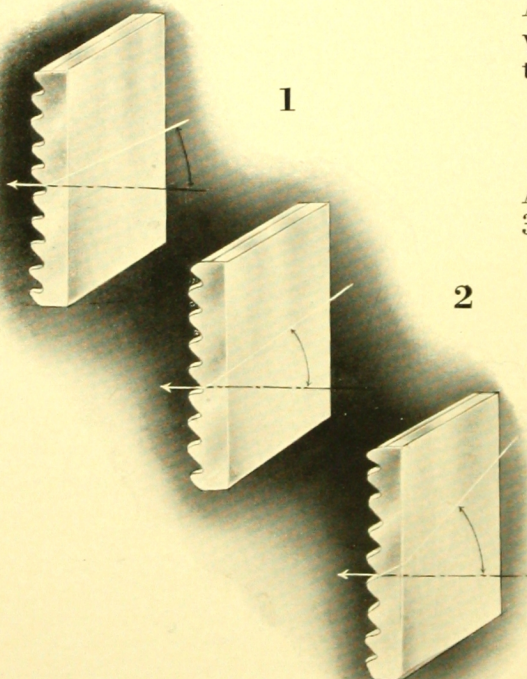
Authorities on works economy and staff welfare attach great importance to the increased efficiency which results when *pure daylight* is used for lighting, instead of artificial light.

A very full and complete investigation by the Industrial Fatigue Research Board in a good number of weaving sheds revealed an increased output of 11% when daylighting was made possible.

Add to this the considerable saving in lighting bills, and you have a strong case for the very widest use of prismatic glass wherever possible.

The efficiency of prismatic glass as a light-conveyor has been well established in hundreds of large factories in this country, where by its special refractive properties it has let daylight into the dark and resulted in better work and lighter bills.

PILKINGTON'S PRISMATIC GLASS is made with the prisms in three angles



Angle No. 1 is recommended for situations where the angle of incidence taken from the horizontal is up to 30° .

Angle No. 2—Where the angle is between 30° and 40° .

Angle No. 3—Where the angle is over 40° .

3 The prisms run *across* the glass, on one side only. They must be glazed on the inside surface, pointing upwards. The outside of the glass is smooth.

60,000 FEET OF DAYLIGHT



Where Erasmic Soap is made. The Factory of Joseph Crosfield and Sons, Warrington. Glazed with 60,000 feet of prismatic glass.

Above, an untouched photograph of the interior, showing how evenly the light is distributed.

The question of natural lighting is one that is far too often neglected. After a casual survey of their window frontage many manufacturers dismiss the matter off-hand, providing there is a tolerable amount of daylight which can be reinforced by artificial means.

Other manufacturers use such means as whitening the walls and ceiling. This certainly is a help, but it only touches the surface of the problem.

Yet here is an economical and practical solution—the use of PRISMATIC GLASS. It costs little more than ordinary glass and it often dispenses entirely with artificial light. Many instances could be quoted of firms who have saved large sums yearly by the simple adoption of Prismatic Glass.

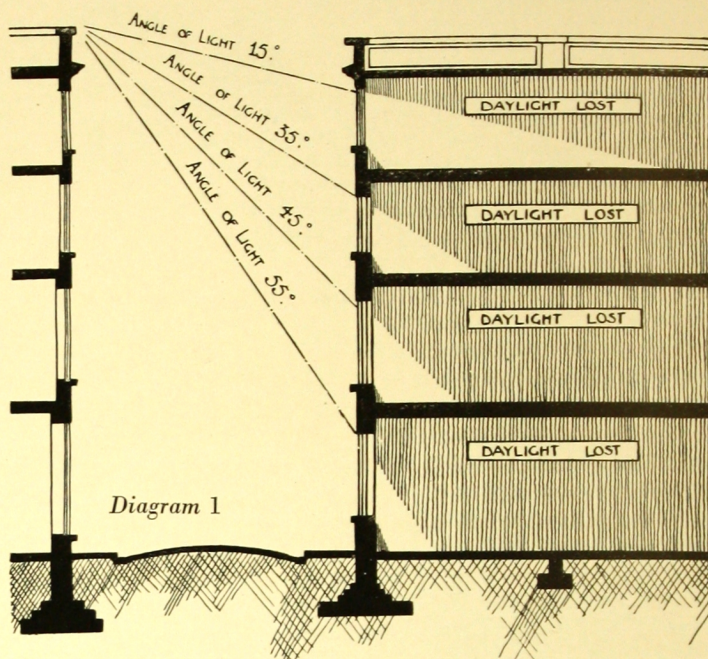
Whenever planning new premises, or taking over old ones, it is worth while giving the lighting question careful consideration. Daylight costs nothing—use more of it and have lighter rooms and lighter bills !

WHAT PRISMATIC GLASS DOES

Prismatic Glass embodies the well-known refractory properties of the prism. The ribbed prisms catch the daylight and transmit it over the entire floor space. The diagrams show better than any description the great advantages of Prismatic Glass in cases where an adjacent building blocks the light.

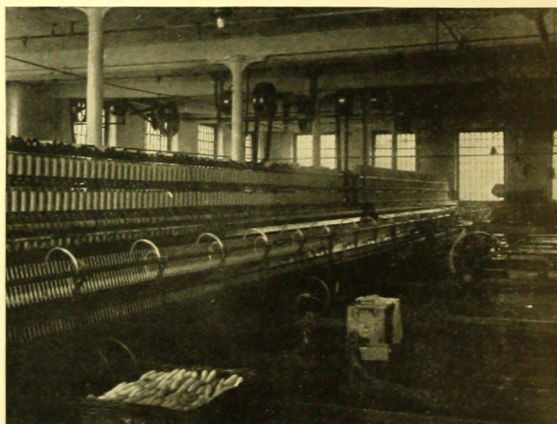
There are three "angles" of prismatic glass which are used on the different floors, to catch the varying angles of light. These three angles of Prismatic Glass (Acute, Medium and Ordinary) meet every requirement.

The Diagram (1) on this page shows the loss of daylight that results when *ordinary glass* is used. It shows a four-storey building overshadowed by a structure of similar height. The light that *does* reach the building falls at angles varying from 15° to 55° . The light passes straight through the glass and illuminates only a small part of each floor.



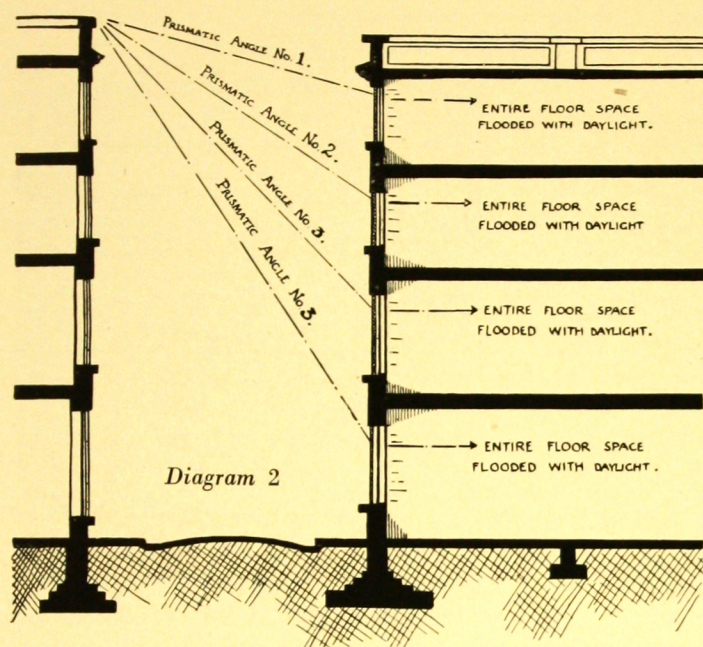
ORDINARY GLAZING

Daylight only received in the space adjacent to windows.



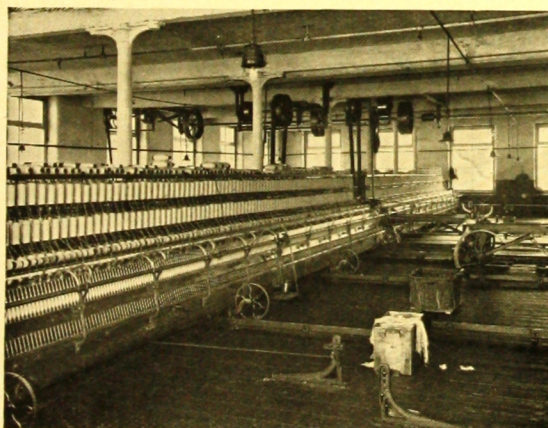
An actual photograph of a Lancashire Spinning shed, showing ordinary lighting.

LIGHTER ROOMS—LIGHTER BILLS



PRISMATIC GLAZING

The rays of light are refracted over the whole of the shed.



An actual photograph of the same shed with prismatic glazing. Note the even distribution of light.

On the other hand, Diagram 2 shows how the same rays of light on passing through prismatic glass are refracted horizontally into the room. The two photographs show an example of the vastly - improved lighting of a spinning shed when our Prismatic Glass was installed.

Actual photographs demonstrate better than words the extraordinary difference that Prismatic Glass makes.

Note how the light is diffused over the whole room, with a comparative absence of cast shadows.

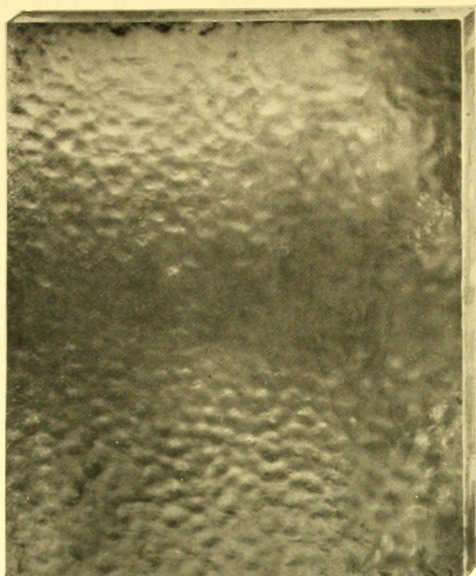
SIZES.

Pilkington's Prismatic Glass is manufactured in dimensions up to 100" wide and 60" high, $\frac{1}{4}$ " in thickness. It can be glazed in existing window frames by any local glazier. No constructional alterations or special equipment are necessary to instal it.

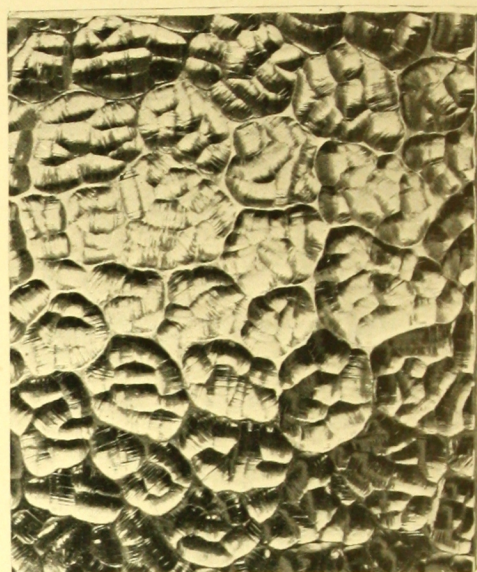
A Special Booklet on Prismatic Glass will be sent on request.



CATHEDRAL GLASS



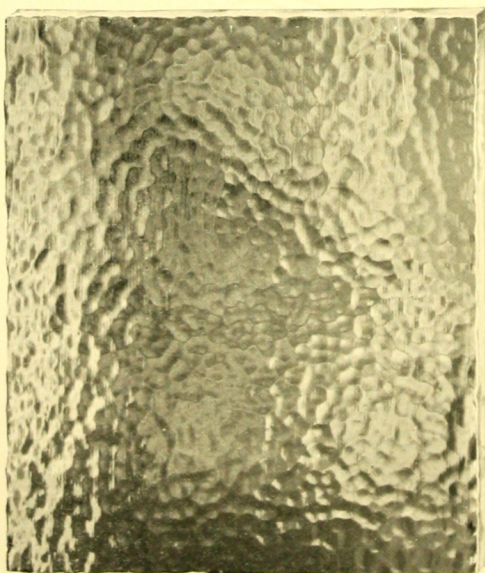
DOUBLE ROLLED GLASS



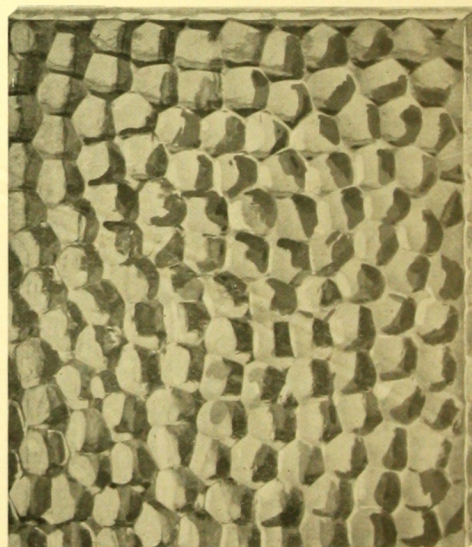
ARCTIC GLASS

(NOTE : These illustrations show the patterns considerably reduced in size.)

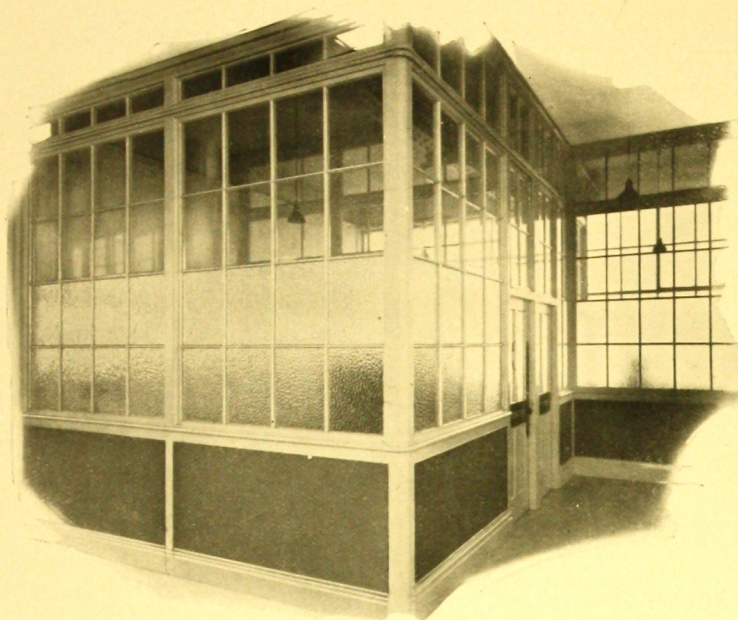
RIMPLED GLASS



SMALL HAMMERED GLASS



CATHEDRAL GLASS



An office glazed with Arctic Glass and first quality sheet. Arctic Glass is highly useful for offices with borrowed light. It gives maximum transparency yet preserves all the privacy that semi-opaque glass ensures.

Cathedral Glass derives its name from its similarity to the glass used in old Cathedrals and Churches.

It is a bright, decorative glazing material which we make in white and in tints, in plain and figured patterns, with a surface of *unsurpassed brilliance*. Cathedral

Glass is rapidly replacing plain sheet glass for interior work, such as shown above, because, while it gives brilliant light, it ensures all the privacy of semi-opaque glass. It can be used with a very pleasing effect to relieve plain glazing.

We make seven plain varieties, which are specially suitable for leaded lights, screens, etc., as follows :

- Clear Cathedral
- Plain Cathedral
- Double Rolled Cathedral
- Rimpled Cathedral
- Waterwite Cathedral
- Small Hammered Cathedral
- Large Hammered Cathedral



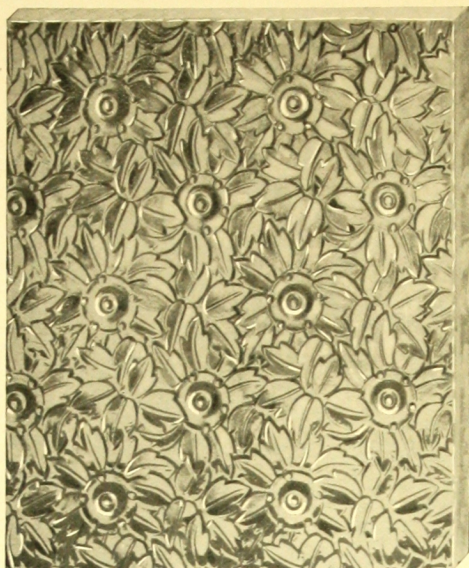
A corner of the Cathedral Glass Warehouse, St. Helens.

SIZES OF CATHEDRAL AND FIGURED ROLLED WHITE

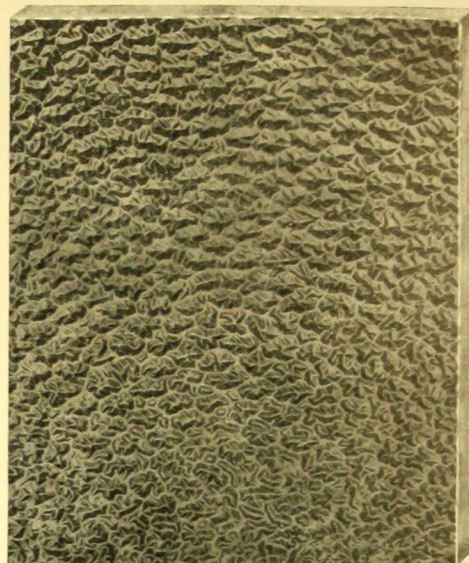
<i>Length.</i>	<i>Width.</i>	<i>Thicknesses.</i>
up to 120"	42"	$\frac{1}{8}$ ", $\frac{3}{16}$ " and $\frac{1}{4}$ "

Send for special folder containing a full list of patterns with illustrations.

FIGURED ROLLED GLASS



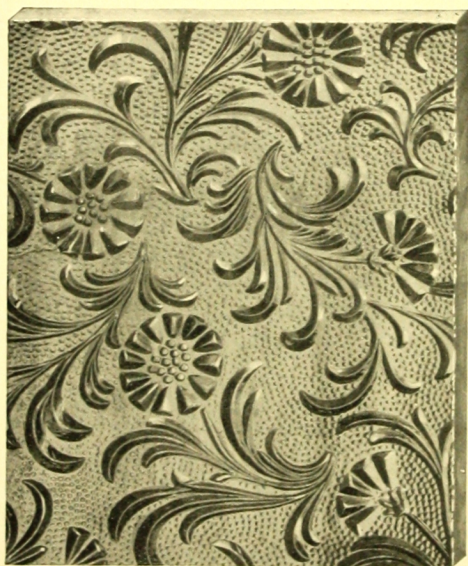
ROSE



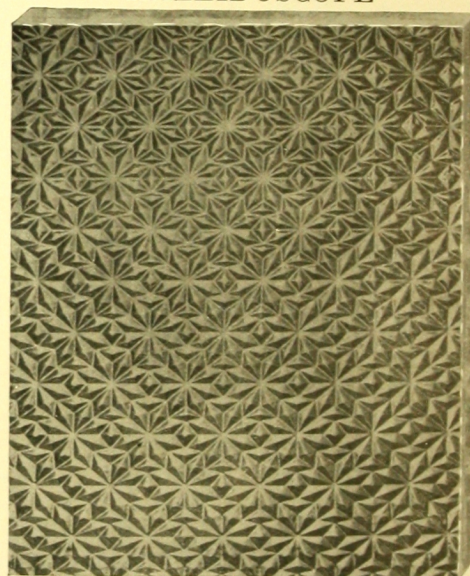
MOROCCO

(NOTE : These illustrations show the patterns considerably reduced in size.)

JAPANESE



KALEIDOSCOPE

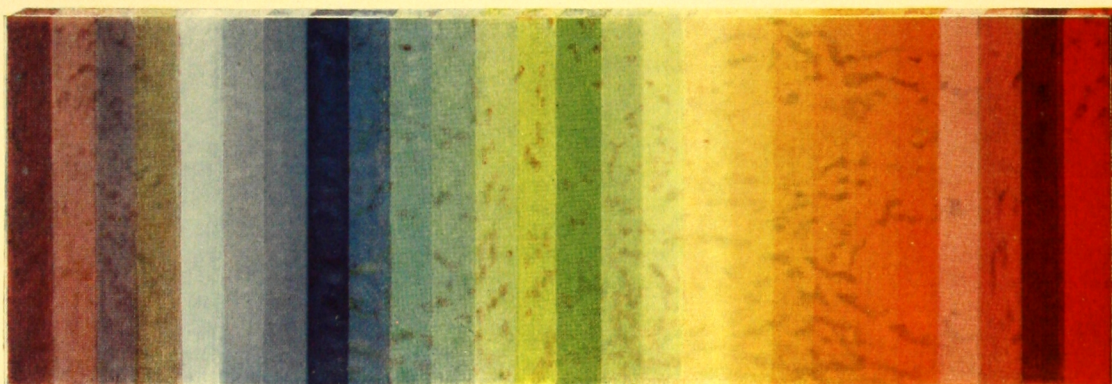


We make 22 Figured Patterns suitable for glazing in squares. They include the following popular designs : Arctic, Morocco, Cretan, Rose, Maltese, Muranese, etc. For windows of schools, offices, banks, public buildings, etc., where a maximum of light is required without too great transparency Cathedral Glass is the most suitable material available.

TINTED CATHEDRAL GLASS



THE SOLAR SPECTRUM



Photograph of Strips of Double Rolled Cathedral Glass showing the wide range of colours.

PILKINGTON'S Figured Rolled and Cathedral Glass is made in a great variety of artistic tints. *Nineteen Figured Patterns* are made in about one dozen of the most popular tints, including shades of Green, Blue, Amber and Pink. The Figured Patterns are:—

Arctic Large	Rose
Arctic Small	Maltese
Muranese Small	Japanese
Muranese Medium	Kaleidoscope
Muranese Large	Rippled
Morocco Small	Quilted
Morocco Large	Persian
Pinhead Morocco	Shell
Cretan Oceanic.	Arabesque.

Small Hammered and Double Rolled Cathedral are made in about 100 different shades, including Green, Blue, Amber and Pink.

Clear Cathedral, Waterwite, Rippled, Plain Cathedral and Large Hammered Cathedral are made in the same tints as the figured patterns above, and can also be had in a number of other standard tints.

Four of these patterns are illustrated overleaf. For other patterns see separate pamphlet which will be sent on application together with boxes of samples where desired.

Bullions are made to order in white and in many of the Cathedral tints for glazing in doors and leaded lights.

SIZES OF TINTED CATHEDRAL

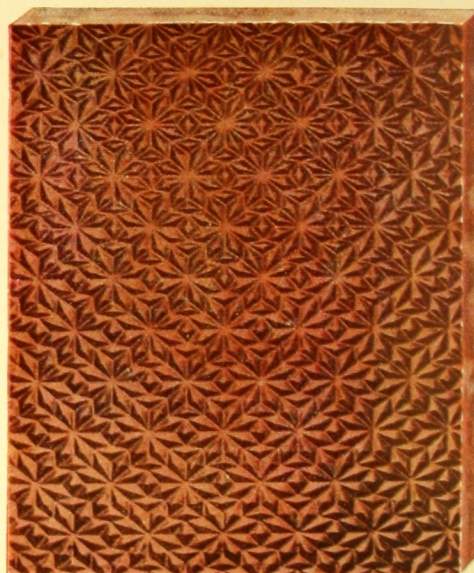
Length	Width	Thicknesses
Up to 100"	36"	$\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ "
or		
Up to 90"	42"	



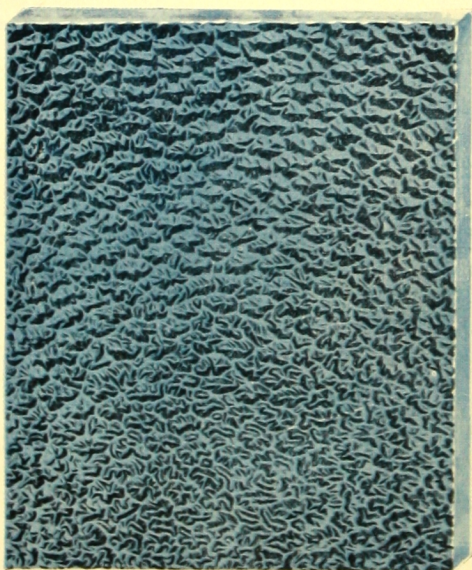
TINTED FIGURED ROLLED GLASS



JAPANESE



KALEIDOSCOPE



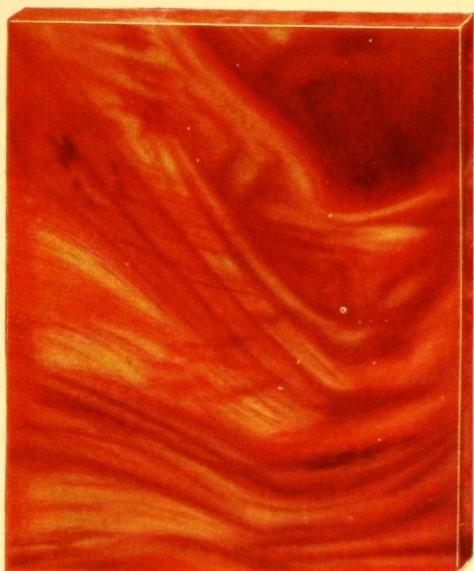
MOROCCO



ROSE

NOTE.—The illustrations show the patterns reduced in size.

VARIEGATED CATHEDRAL GLASS



RUBY ON YELLOW



CHOCOLATE ON YELLOW



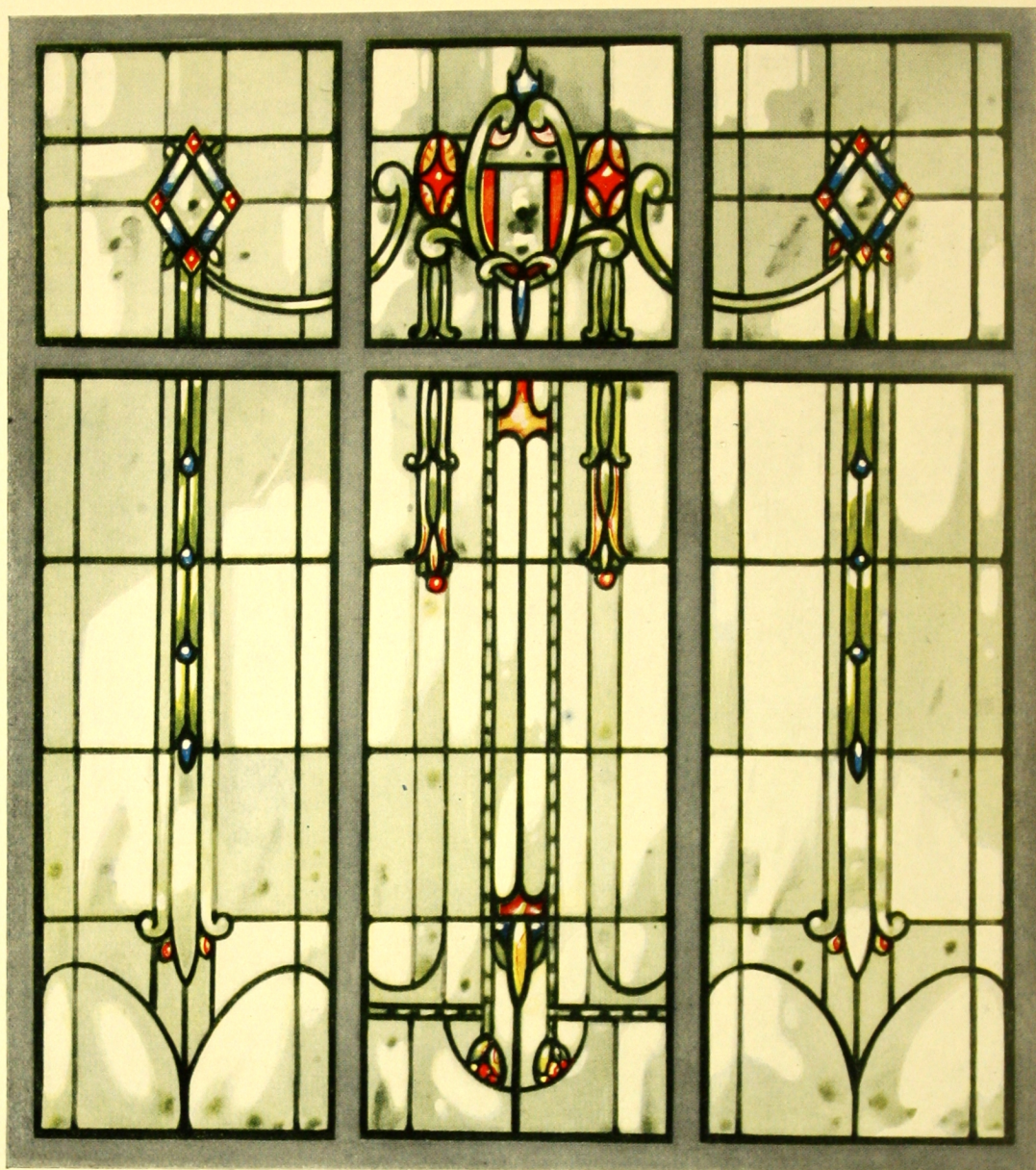
BLUE ON WHITE



GREEN ON OPALESCENT

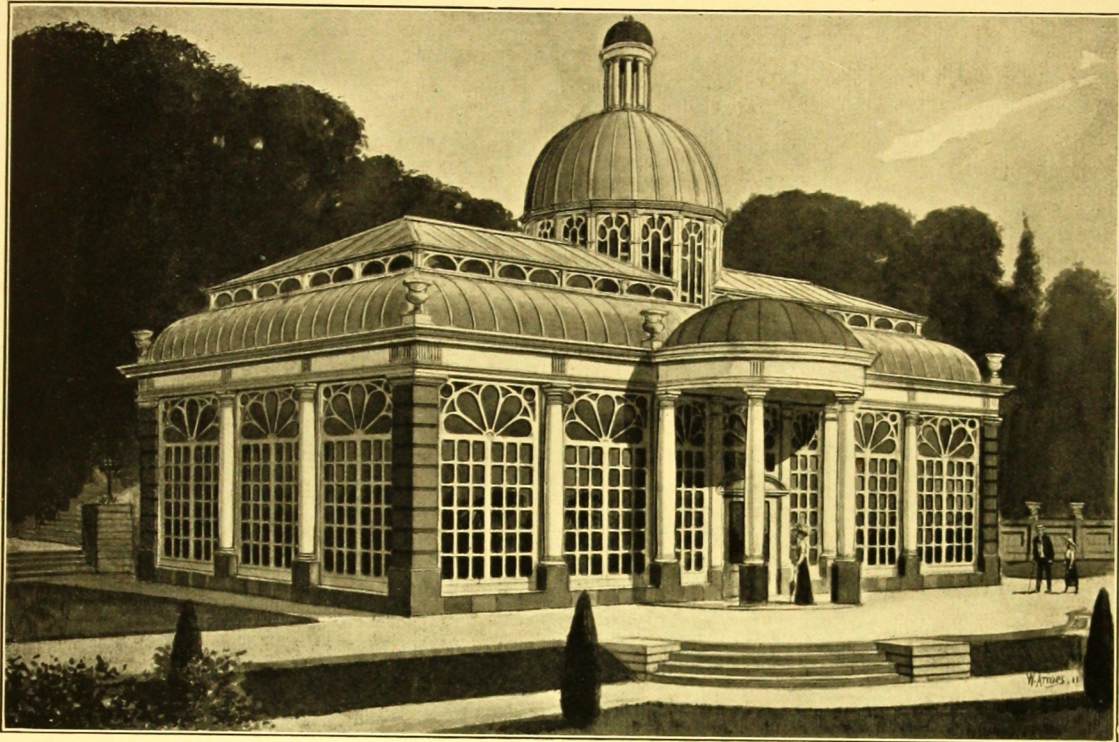
NOTE.—The illustrations show the patterns reduced in size.

LEADED LIGHTS



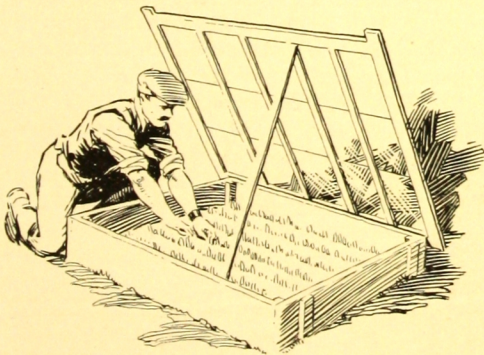
WE can supply leaded lights to order at short notice. A range of standard designs in full colour will be sent on request. Special designs prepared for all purposes.

Horticultural Glass



By courtesy of Boulton & Paul Ltd.

From Cucumber Frame to Winter Garden



There is a popular but erroneous idea that almost any kind of Sheet Glass is suitable for horticultural purposes. The term "Garden Glass" is not unknown in the trade, yet it will be obvious to everyone that, though Glass for the purpose is sold relatively cheaply because of the small sizes in which it is generally used, the particular importance of weather-resisting qualities is not any less than in the case of Glass used for any other form of glazing.

Horticultural glass must be made to withstand extreme climatic conditions on both its surfaces, rain and cold outside, warm humidity inside. It is the barrier between summer and winter!

Our Horticultural glass is made to withstand these conditions without loss of brilliance, and whether used in humble "pit-light" or stately conservatory, it maintains its transparency until the end.

SHEET OR WINDOW GLASS

Sheet Glass, or "Blown" Glass, as it is called, is the cheapest and most widely used form of glazing. Although it is impossible to make Sheet Glass without minor irregularities of surface or "waves," the better qualities serve their purpose excellently.

We have devoted our researches since 1826 to the betterment of Window Glass in this country, and have succeeded in producing qualities in which surface irregularities are almost eliminated, and distortion reduced to a minimum.

The manufacturing process is entirely different from that of Polished Plate, although the ingredients are much the same.

We manufacture Sheet Glass by two different methods—"Hand Blown" and "Cylinder Drawn."



"Hand Blowing." The glass is gathered on the end of the blowpipe, then moulded and blown into a long cylinder.

Hand Blowing

"Hand Blowing" is one of the very earliest methods of glass making, and certain wall paintings at Beni Hassan in Egypt, which are at least five thousand years old, show that even at that early date the art of glass making was in an advanced stage.

In "Hand Blowing" the molten metal is gathered on the end of a blowpipe in the form of a globular mass about the size of a man's head. This "gather" is then shaped and carried by the blower to a stage where the glass is distended by blowing and elongated by swinging. By repeated re-heating, blowing and elongation, a cylinder is produced, uniform in diameter and thickness throughout its length. The cylinder, after being removed from the pipe and allowed to cool, is then sent forward to the Splitting Room.

"Hand Blowing" is an exceptionally highly skilled art, and to a great extent it is on the skill of the workmen that the final quality of the glass depends. There are certain kinds of glass which can be produced in this manner better than any other, and for this reason we maintain and encourage this

The blown cylinders, with ends cut off, are split lengthwise and put into a kiln. This "unrolls" them and they lie flat.

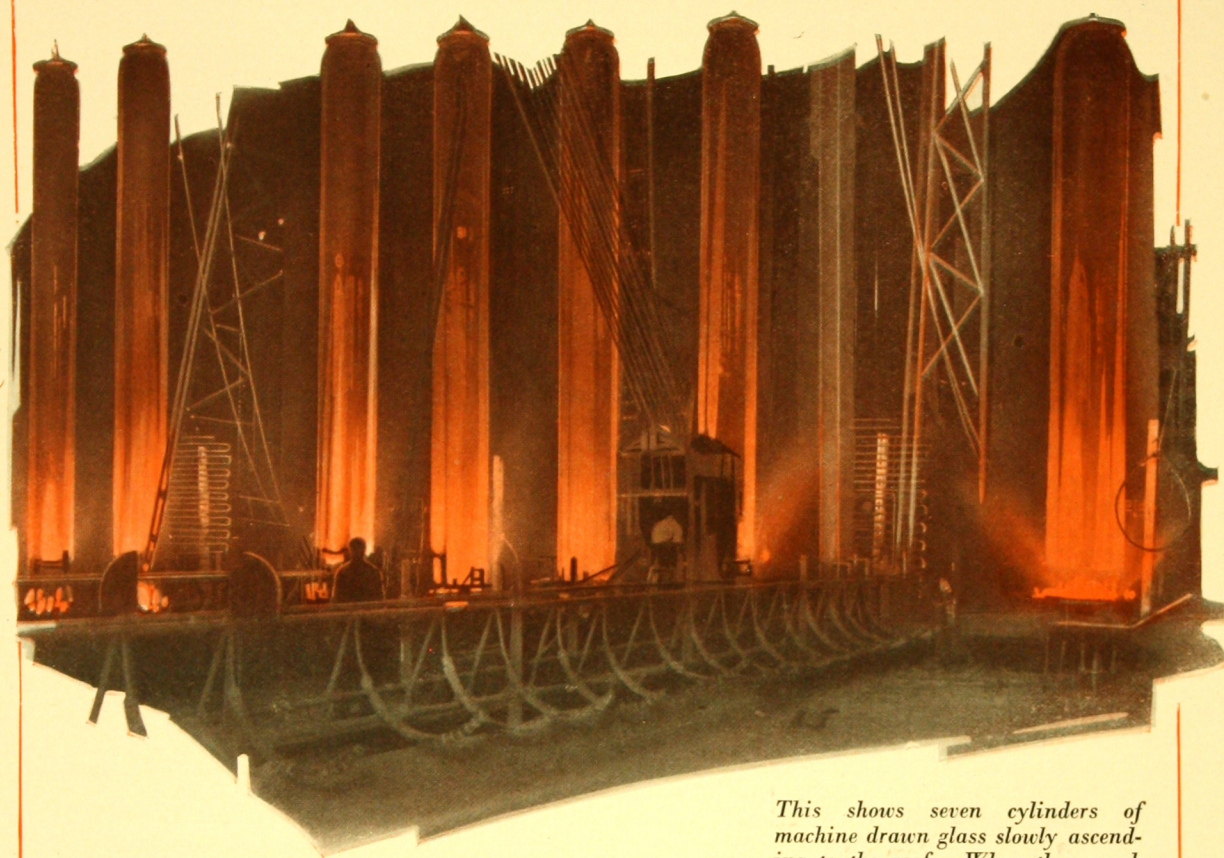


interesting method of manufacture. Although this art is so very old, we have been able during the past few years to introduce many radical improvements.

The distinctive characteristic of sheet glass is the brilliance and hardness of its surface. The original vitreous surface formed when the glass solidifies is maintained unspoiled during the subsequent processes of manufacture.

Photographic Plates, fine quality picture and window glass are examples of the high perfection of skill attained by the workmen in our sheet glass works.

'MACHINE DRAWN' SHEET GLASS



This shows seven cylinders of machine drawn glass slowly ascending to the roof. When they reach 40 ft. high they are cut off and lowered to the rests shown in the foreground.

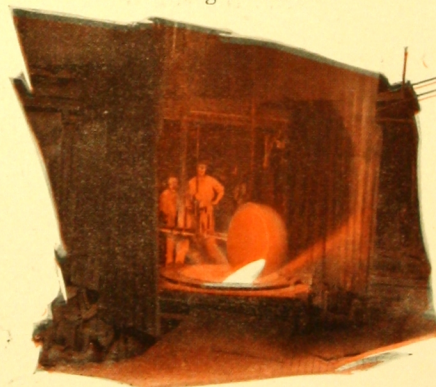
Machine Drawn Glass

The Drawing Machine carries out the same process mechanically, but on a much larger scale.

The process presents an imposing sight ; at one end of the shed, let in the ground, lie eight or ten crucibles containing the glowing metal. Above is the drawing mechanism by means of which a metal pipe or "bait" is lowered into the crucible. The glass adheres, and as the "bait" is raised the glass is drawn up with it. After the draw starts the cylinder is distended to the required diameter by the introduction of compressed air : the pressure of this air being so regulated that the diameter is kept constant. In this way a cylinder some 40 feet in height, uniform in diameter and thickness, is obtained.

The fierce glow of the pots, the long shining cylinders slowly ascending, make a scene long to be remembered. One by one the cylinders reach the dark roof of the

Filling a crucible.



SHEET OR WINDOW GLASS

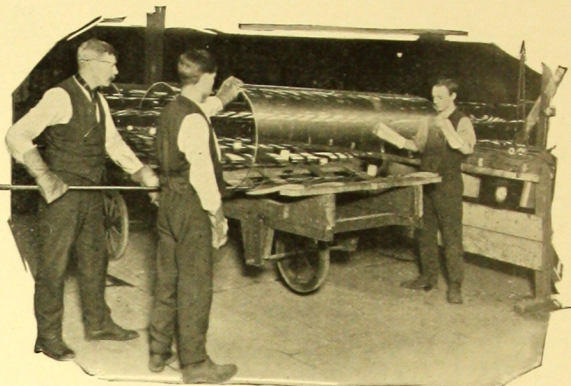
building. By this time the glass is quite set and shining just as it appears in windows.

The cylinders are neatly severed from the crucibles and lowered on to the racks or rests which stand in front to receive them. An intricate arrangement of ropes, pulleys and rigging swings them easily down without assistance by hand.

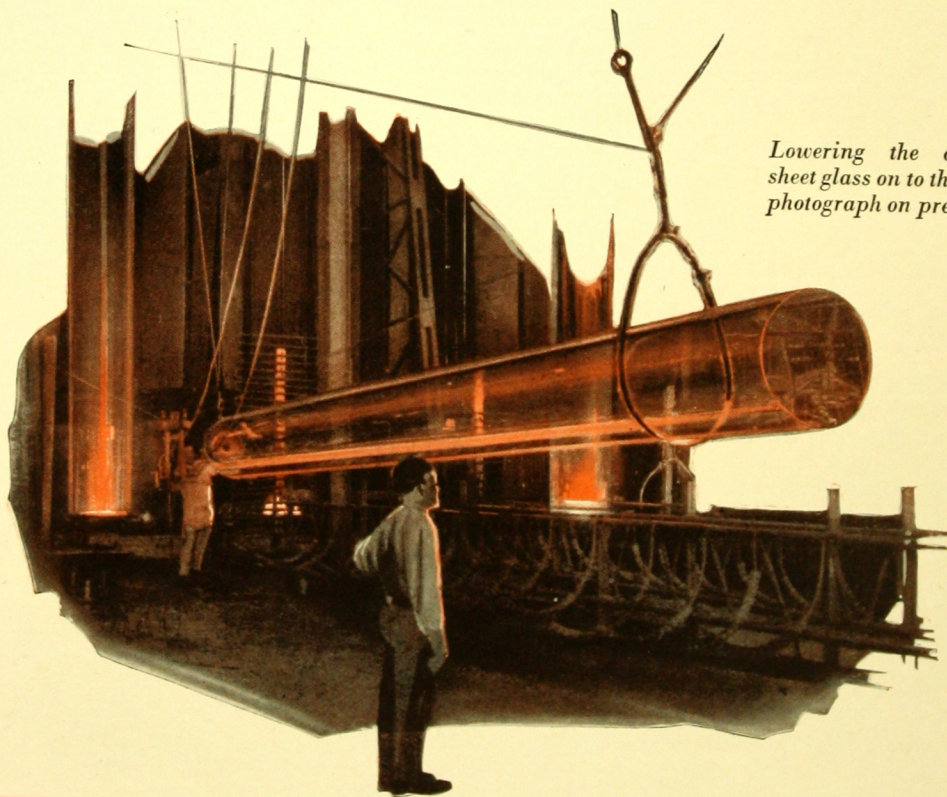
There they are cut into shorter lengths and carried by trolleys to the Splitting Room.

Flattening

In the Splitting Room the cylinders are carefully examined under special lighting, so that no defects may be overlooked. Those passed as being up to "Pilkington quality" are split longitudinally and sent on to the flattening kilns. The split cylinders are placed in the flattening kilns where the heat softens the glass, thus enabling the flattener to unroll them on to a perfectly flat bed on which they are smoothed down with a wooden "polissoir." The glass now being in flat sheets is passed down a small lehr in order that it may be perfectly annealed. It is correct annealing that ensures the good cutting qualities of the glass. The glass is now sent to the Cutting Room and Warehouse where it is graded for quality and cut to the requisite sizes.



*Examining and splitting the cylinders.
Note the row of lights.*



*Lowering the cylinders of
sheet glass on to the rests. (See
photograph on previous page.)*

QUALITIES OF SHEET GLASS

There are four qualities of Pilkington's Sheet Glass, which cover every requirement. These standards and qualities are strictly adhered to, and they are maintained by the fact that we always have a large number of furnaces in operation.

This means *no variation*, as contrasted with foreign manufactories, less completely equipped, who turn out many different brands with as many different standards. The four qualities of Pilkington's Sheet Glass are as follows :

1st Quality.—Undoubtedly the finest Sheet Glass manufactured at the present day, with exceptional surface finish and flatness. Used principally for pictures, cabinets and similar furnishings.

2nd Quality.—The accepted quality for Sheet Glass in public buildings, private residences, offices, studios, etc.

3rd Quality.—Suitable for most ordinary work in buildings, conservatories, etc.

4th Quality.—For cheap glazing in workshops, greenhouses, horticultural work and small cottages. Although this is 4th quality, architects, whose opinions are valuable, grade it considerably higher than other glass on the market sold at a similar price.

NOTE.—In the Building Trade the word "Second" in reference to Quality, is usually understood to mean an inferior quality. This is not the case in the Glass Trade in which the standard Pilkington qualities are as described above.

FLUTED SHEET GLASS

This is a semi-transparent glass often used for screens, partitions, etc., in offices and factories.

<i>Approx. Weight per Superficial Foot</i>	<i>Extreme Sizes in One Sheet</i>
15 oz.	55"×36" or 50"×40"
21 oz.	65"×40" or 55"×50"
26 oz.	60"×40" or 50"×50"

32 oz. if required.

PHOTOGRAPHIC GLASS

We supply this glass in thicknesses varying from 9 oz. to 21 oz., according to the purpose required. The leading Dry Plate Manufacturers use Pilkington's Photographic Glass, for it is unrivalled for consistently high quality, even thickness and accurate cutting.

SILK FINISH GLASS has a special surface obscurity for the most exact photographic screen work. Made in 9/12 oz. in squares up to 40"×24".

Our 9/12 oz. glass is widely used for **LANTERN SLIDES** and slide cover work.

ORNAMENTAL SHEET GLASS

Sheet Glass can be supplied with designs worked upon its surface in enamelled, mechanical, embossed, crystalline, and other processes.

LARGEST SIZES, WEIGHTS & SUBSTANCES of SHEET GLASS.

<i>Approx. Weight per Superficial Foot</i>	<i>Length</i>	<i>Width</i>
15 oz.	60" × 40"	
21 oz.	81"×42" or 68"×50"	
26 oz.	81"×45" or 70"×51"	
32 oz.	74"×39" or 58"×50"	
36 oz.	72"×36" or 58"×44"	
42 oz.	62"×35" or 54"×41"	

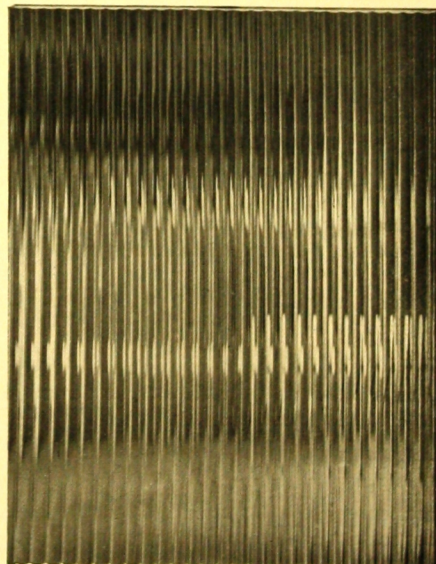
These large sizes are made for cutting up for the usual sash dimensions. They are not suitable for glazing in single sheets.

All substances of glass up to 48" wide can be "obscured" if necessary.

MILL AND FACTORY GLAZING

is supplied from stock in the following sizes (26 and 32 oz.)

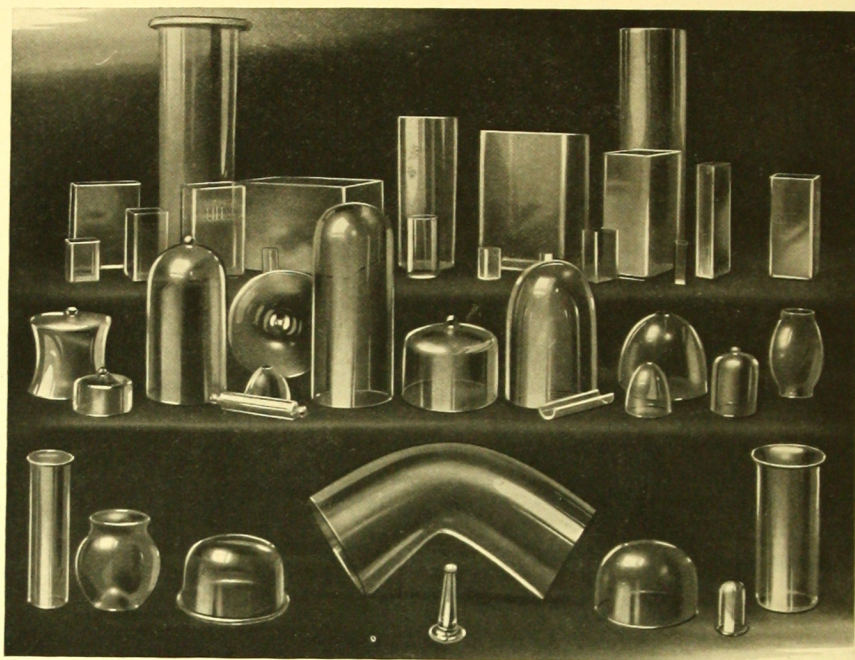
<i>Lengths</i>	<i>Widths</i>
from 56"/60" × 36"/40"	
56"/60" × 18"/22"	
36"/40" × 28"/30"	
28"/30" × 18"/22"	
36"/40" × 18"/22" or divisibles	



FLUTED SHEET GLASS

MISCELLANEOUS ARTICLES OF GLASS

For Electrical, Domestic, and Other Purposes



THE above photograph shows a variety of glass articles made in our works at St. Helens. It indicates how the use of glass has spread to many industries which hitherto used more costly but less efficient materials.

GLASS Battery Boxes, for instance.

We supply large quantities of these boxes to battery makers, for use in lighting our national railways. Most of the Indian railways, too, use our glass battery boxes in place of the old-fashioned wooden kind. One big advantage of the glass battery box is that, being transparent, it shows the condition of the contents at a glance—a great saving of time in the examination of batteries.

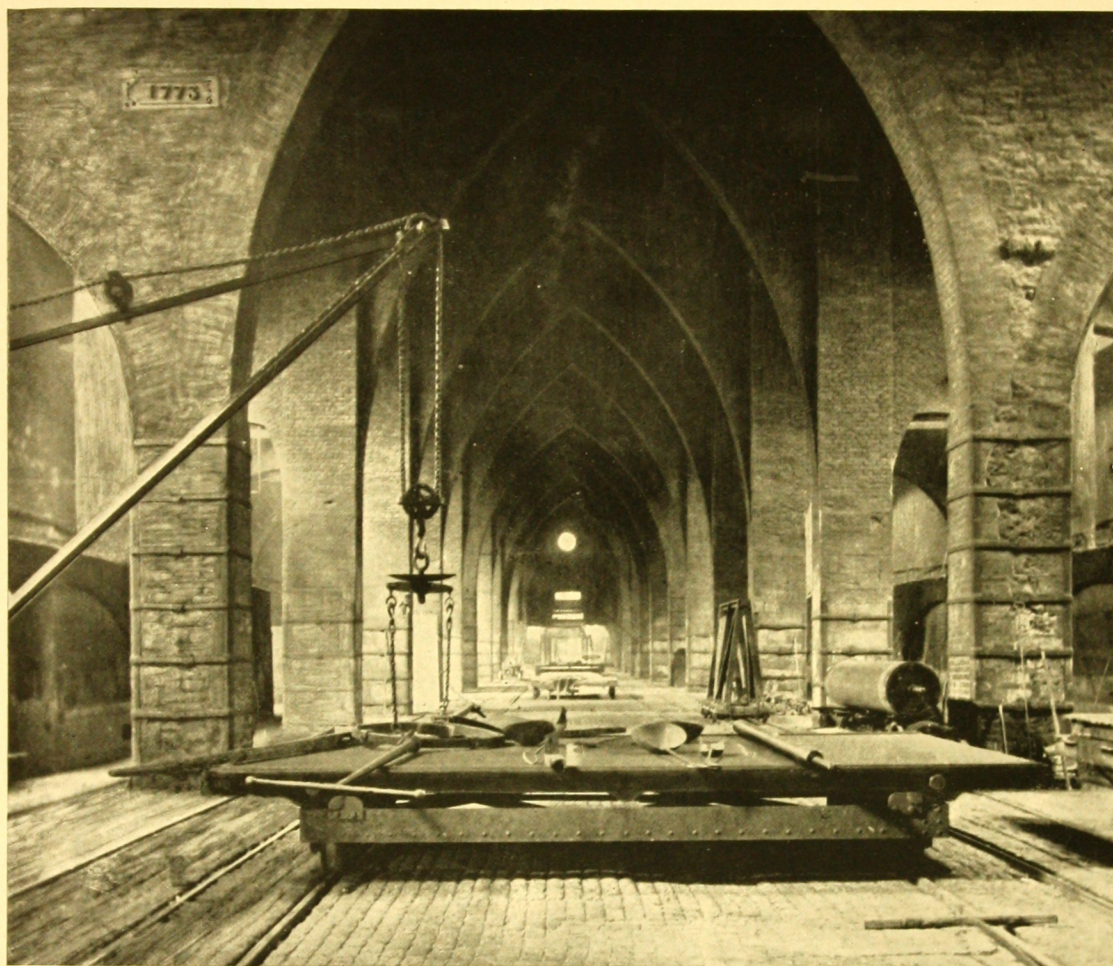
Another advantage is that acid cannot affect a glass battery box, as so often happens with a wooden, lead-lined container.

The solid construction of glass battery boxes ensures that *breakage is quite negligible*, and as they are cheaper than any other kind of container, railway companies have been able to effect considerable economies by adopting them.

Other miscellaneous articles include:

Glass Boxes for Electric Storage Batteries.
Open Top Jars for Primary Cells.
Insulators for Storage Batteries.
Lighting Globes of various shapes.
Pipes, flanged and bent, for chemical purposes.
Propagating Glasses.
Straight Aquariums and Fish Globes.
Rolling Pins and Pastry Boards.
Shades for covering flowers, ornaments, etc. (round oval & square).
Vases with lipped and polished edges.

Other Days, Other Ways



The Old Casting Hall at Ravenhead

Reminiscent of some ancient church, the original Casting Hall still stands in the works at Ravenhead, undisturbed by the ceaseless activity which surrounds it.

Here it was in 1773 that the British Plate Glass Company produced their first cast plate.

Her Majesty Queen Alexandra (as

Princess of Wales) saw glass made here in 1865.

Since then the hand of progress has wrought but little change in the appearance of the Hall. Parts have been pulled down to make room for the Cathedral Works, but the central aisle shown above has been preserved on account of its historical associations.

British Glass
for
British Homes
C



*The 4 o'clock Glass Train
leaving Cowley Hill.*



